



OX-400 / 401

## Features

- 4-Pin Dip
- Fast warm-up
- TCXO replacement for better short term stability
- Frequency Range, 10 MHz to 40 MHz
- Standard frequencies, 10, 19.44, 20, 24.576, 25, 26, 38.88, 40 MHz;

## Applications

- Base stations
- Test equipment
- Synthesizers
- Military communication equipment

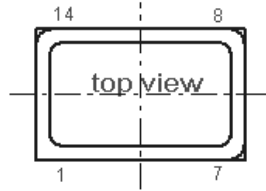
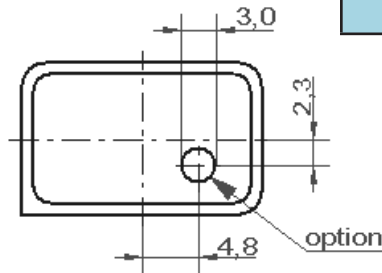
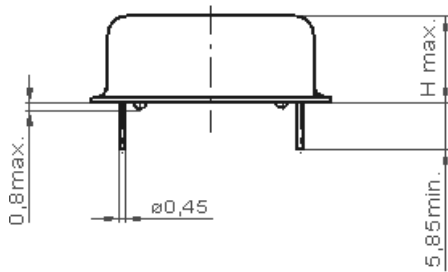
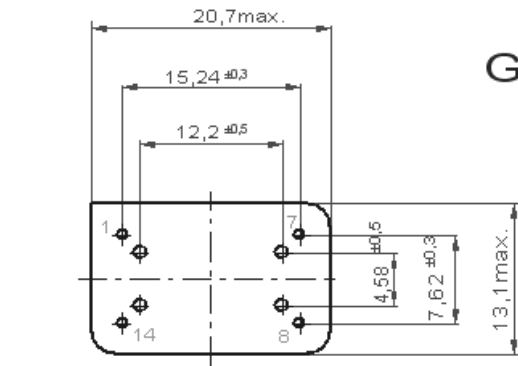
## Performance Specifications

| Frequency Stabilities <sup>1</sup> ( 10 to 40 MHz)       |       |         |       |         |                                                        |
|----------------------------------------------------------|-------|---------|-------|---------|--------------------------------------------------------|
| Parameter                                                | Min   | Typical | Max   | Units   | Condition                                              |
| vs. operating temperature range<br>(referenced to +25°C) | -5    |         | +5    | ppb     | -40 to +85°C                                           |
|                                                          | -10   |         | -10   | ppb     | -40 to +85°C                                           |
|                                                          | -10   |         | -10   | ppb     | -40 to +95°C                                           |
| Initial tolerance                                        | -0.2  |         | +0.2  | ppm     | at time of shipment, nominal EFC                       |
| vs. supply voltage change                                | -10   |         | +10   | ppb     | V <sub>s</sub> ±5% static                              |
| vs. load change                                          | -10   |         | +10   | ppb     | Load ±5% static                                        |
| vs. aging / day                                          | -1.0  |         | +1.0  | ppb     | after 30 days of operation                             |
| vs. aging / year                                         | -100  |         | +100  | ppb     | after 30 days of operation                             |
| vs. aging / 10 years                                     | -1000 |         | +1000 | ppb     | after 30 days of operation                             |
| hold over                                                |       |         |       |         |                                                        |
| start up time                                            |       |         |       |         |                                                        |
| Warm-up time                                             |       |         | 3     | minutes | to ±100ppb of final frequency (1 hour reading) @ +25°C |

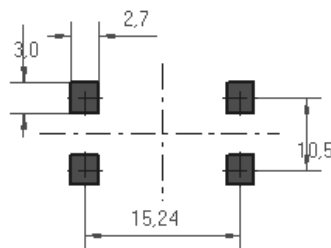
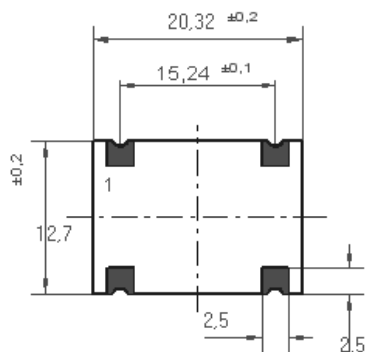
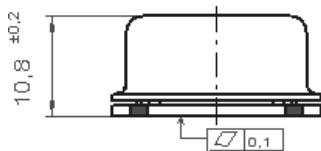
## Performance Specifications

| Supply Voltage (Vs)        |                            |                                     |       |                                                |                                            |         |
|----------------------------|----------------------------|-------------------------------------|-------|------------------------------------------------|--------------------------------------------|---------|
| Parameter                  | Min                        | Typical                             | Max   | Units                                          | Condition                                  |         |
| Supply voltage (standard)  | 3.135                      | 3.3                                 | 3.465 | VDC                                            |                                            |         |
|                            | 4.75                       | 5.0                                 | 5.25  | VDC                                            |                                            |         |
| Power consumption          |                            |                                     | 2.5   | Watts                                          | during warm-up                             |         |
|                            |                            |                                     | 1.0   | Watts                                          | steady state @ +25°C                       |         |
| RF Output                  |                            |                                     |       |                                                |                                            |         |
| Signal [standard]          | HCMOS                      |                                     |       |                                                |                                            |         |
| Load                       |                            | 15                                  |       | pF                                             |                                            |         |
| Signal Level (Vol)         |                            |                                     | 0.4   | VDC                                            | with Vs=3.3V and 15pF Load                 |         |
| Signal Level (Vol)         |                            |                                     | 0.5   |                                                | with Vs=5.0V and 15pF Load                 |         |
| Signal Level (Voh)         | 2.4                        |                                     |       | VDC                                            | with Vs=3.3V and 15pF Load                 |         |
| Signal Level (Voh)         | 3.5                        |                                     |       |                                                | with Vs=5.0V and 15pF Load                 |         |
| rise time                  |                            |                                     | 5     | ns                                             |                                            |         |
| fall time                  |                            |                                     | 5     | ns                                             |                                            |         |
| Duty Cycle                 | 45                         |                                     | 55    | %                                              | @ (Voh-Vol)/2                              |         |
| Frequency Tuning (EFC)     |                            |                                     |       |                                                |                                            |         |
| Tuning Range               | Fixed OCXO; No adjust      |                                     |       |                                                | Opti-<br>on <sup>s</sup>                   |         |
|                            | ±1.0                       |                                     | ±3    | ppm                                            |                                            |         |
| Linearity                  | 10%                        |                                     |       |                                                |                                            |         |
| Tuning Slope               | Positive                   |                                     |       |                                                |                                            |         |
| Control Voltage Range      | 0.0                        | 1.4                                 | 2.8   | VDC                                            | with Vs=3.3V                               |         |
|                            | 0.0                        | 2                                   | 4.0   | VDC                                            | with Vs=5.0V                               |         |
| Additional Parameters      |                            |                                     |       |                                                |                                            |         |
| Phase Noise <sup>3</sup>   |                            | -85<br>-121<br>-140<br>-152<br>-155 |       | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz | 1 Hz<br>10 Hz<br>100 Hz<br>1 kHz<br>10 kHz | @ 20MHz |
| Weight                     |                            |                                     | 8.0   | g                                              |                                            |         |
| Processing & Packing       | Handling & Processing Note |                                     |       |                                                |                                            |         |
| Absolute Maximum Ratings   |                            |                                     |       |                                                |                                            |         |
| supply voltage (Vs)        |                            |                                     | 5.5   | V                                              | with Vs=3.3 & 5.0 VDC                      |         |
| Output Load                |                            |                                     | 50    | pF                                             |                                            |         |
| Operable Temperature Range | -45                        |                                     | +85   | °C                                             |                                            |         |
| Storage Temperature Range  | -45                        |                                     | +85   | °C                                             |                                            |         |

G 125



G 269



Padvorschlag  
PCB Layout

OX-400

| Height "H" | Pin Length "L" |
|------------|----------------|
| 8.5        | 5.85min.       |
|            |                |
|            |                |
|            |                |

Pin Connections

|    |                                          |
|----|------------------------------------------|
| 1  | Electronic Frequency Control Input (EFC) |
| 7  | Ground (Case)                            |
| 8  | RF Output                                |
| 14 | Supply Voltage Input                     |

OX-401

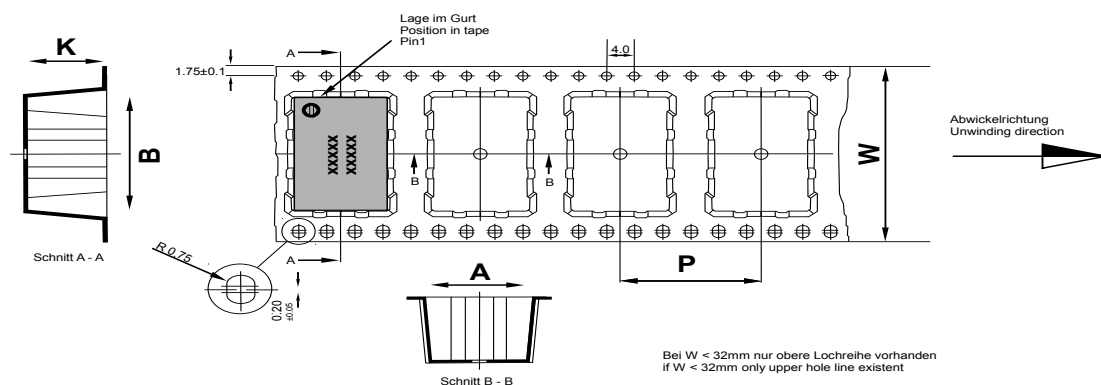
| Height "H" | Pin Length "L" |
|------------|----------------|
| 10.8       | N/A            |

Pin Connections

|    |                                          |
|----|------------------------------------------|
| 1  | Electronic Frequency Control Input (EFC) |
| 7  | Ground (Case)                            |
| 8  | RF Output                                |
| 14 | Supply Voltage Input                     |

Dimensions in inches mm

## Standard Shipping Method (OX-401)



Maßangaben in mm:

A, B und K Maße von Bauelement abhängig

Fertigungstoleranzen entsprechen der DIN IEC 286-3

Dimension in mm:

A, B und K are dependent upon component dimensions

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 |
|----------------|-------------------|--------------------|-------------------|-------------|
| Typ OX-401     | 32                | 50                 | 250               | 20          |

## Standard Shipping Method (OX-400)

| Enclosure Type | Method | columns | rows | Quantity per Tray |
|----------------|--------|---------|------|-------------------|
| Typ OX-400     | Tray   | 10      | 8    | 80                |

## Recommended Reflow Profile

IPC/JEDEC J-STD-020 (latest revision)

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                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Rapid temperature changes | MIL-883-1010 Cond B 1000 cycles -55/125C                                                                                                   |
| Vibration                 | MIL-STD-883 Meth 2007 Cond A 20G 20-2000Hz 4x in each 3axis 4 min                                                                          |
| Shock                     | JESD22-B104-B 100G 1,5ms 6 shocks in each direction                                                                                        |
| Solderability             | J_STD_002C Cond A, Through hole device/ Cond. B, SMD 255C (dipping time 50,5sec.) Dip+Look with 8h damp pre-treatment: solder wetting >95% |
| Solvent resistance        | MIL-STD-883 Meth 2015 Solv. 1,3,4                                                                                                          |
| ESD                       | HBM JESD22-A114-E Class 2 10* 2000V                                                                                                        |
| Moisture Sensit.          | Level 1 JESD22-A113-B                                                                                                                      |
| RoHS compliance           | 100% RoHS 6 compliant                                                                                                                      |
| Washable                  | washable device                                                                                                                            |

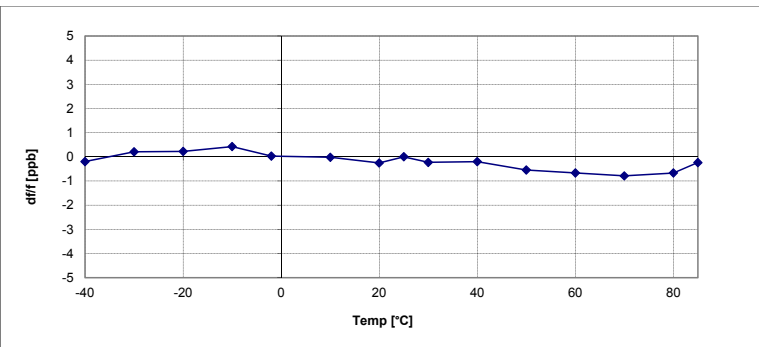
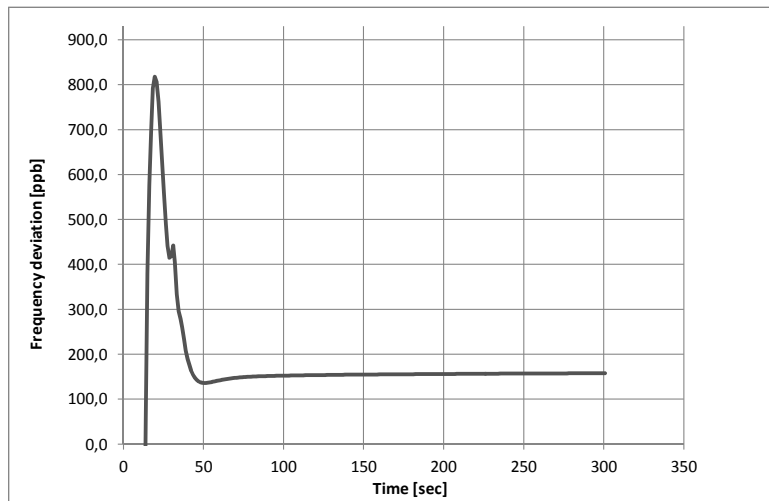
# typical performance data

## typical warm up

@ OX-400-EAE-1080-20M000

## typical temp stability

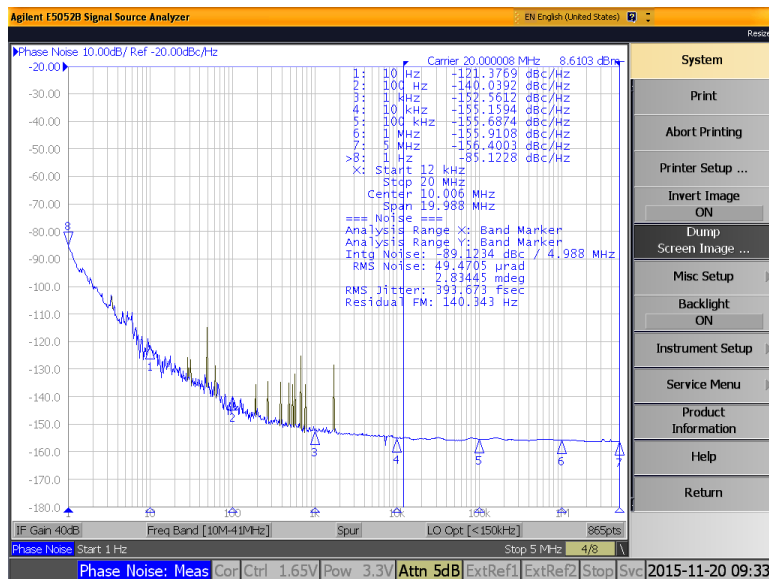
@ OX-400-EAE-1080-20M000



## typical Phase Noise

@ OX-400-EAE-1080-20M000

@ OX-400-EAE-1080-20M000



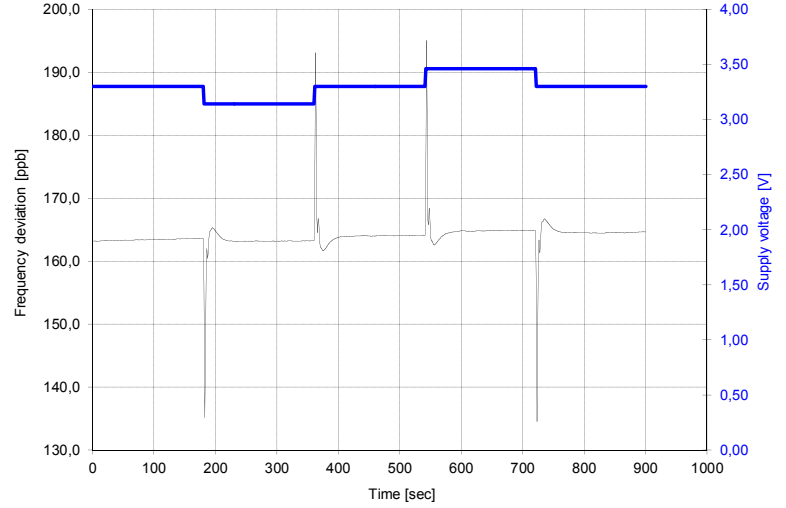
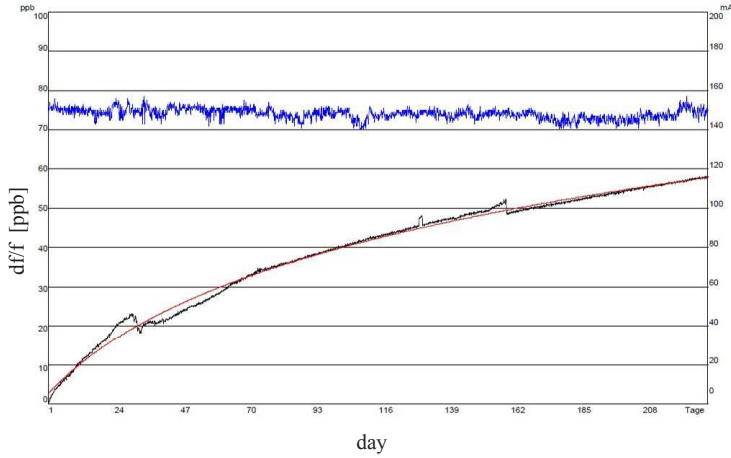
# typical performance data

## typical aging data

@ OX-400-EAE-1080-20M000

## typical frequency vs. supply voltage

@ OX-400-EAE-1080-20M000

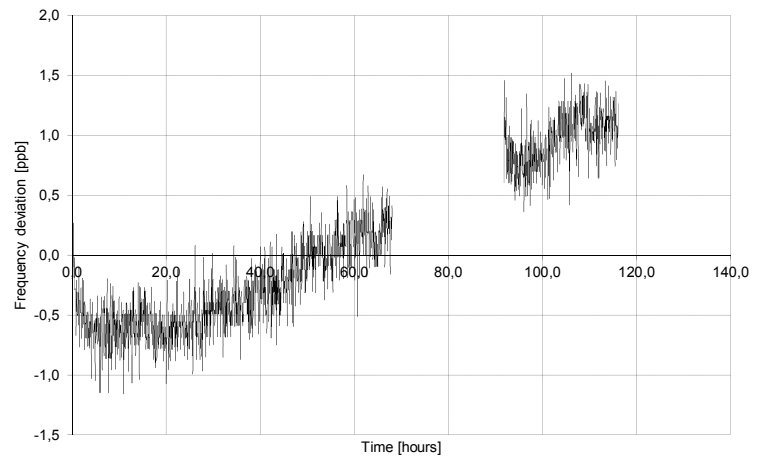
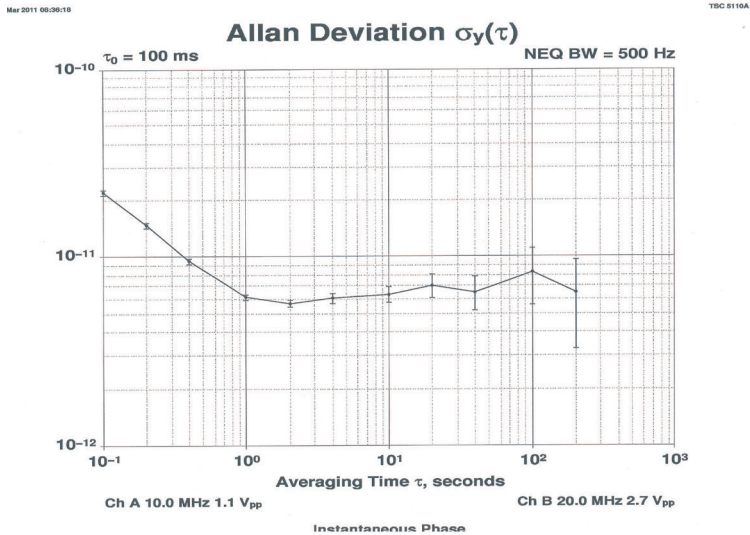


## typical ADEV

@ OX-400-EAE-1080-20M000

## typical retrace

@ OX-400-EAE-1080-20M000



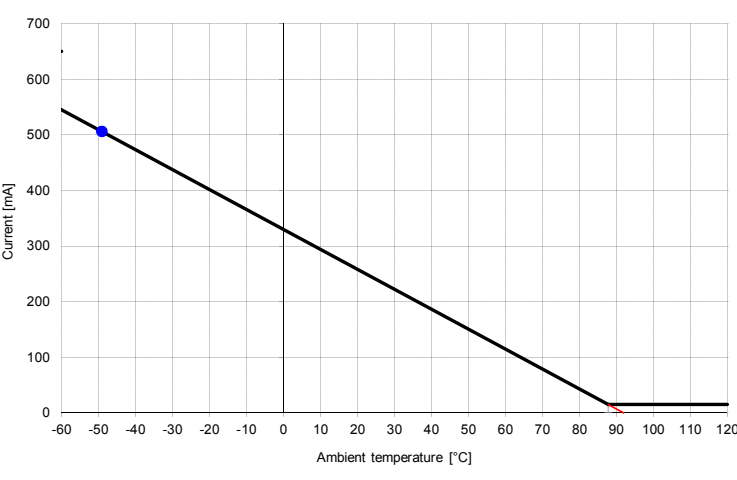
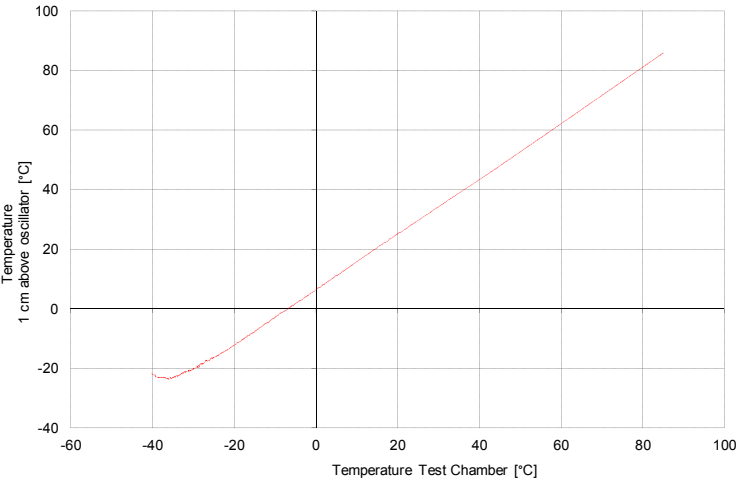
typical performace data

typical case temperature vs outside temperature

@ OX-400-EAE-1080-20M000

typical power consumption vs operating temperauture

@ OX-400-EAE-1080-20M000

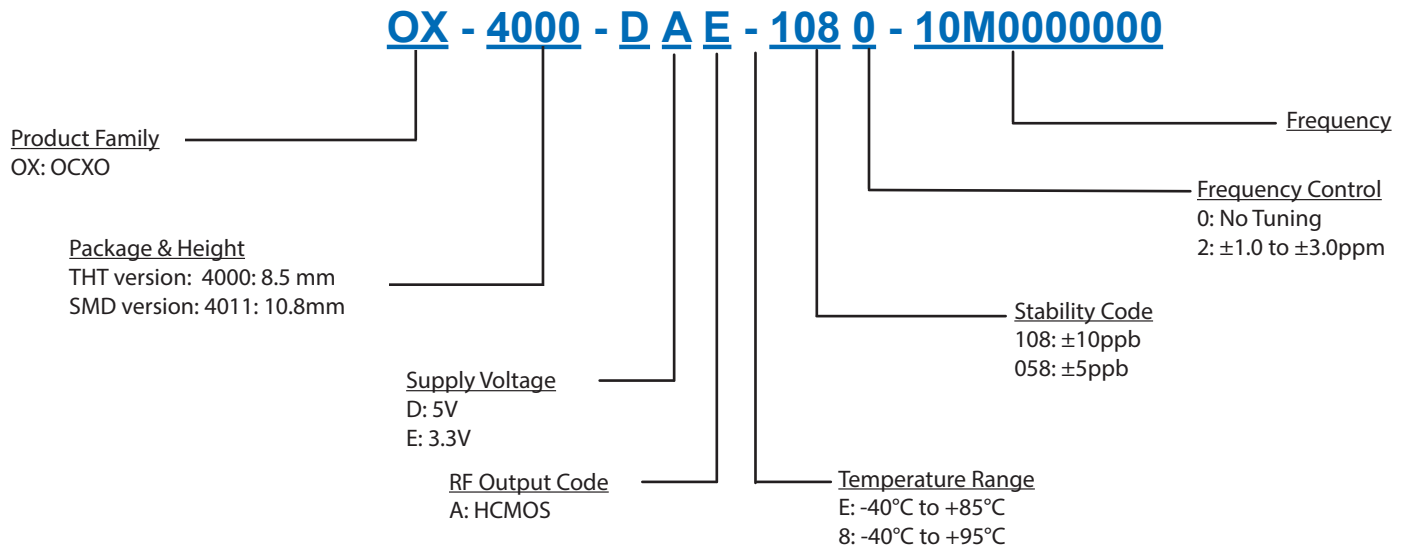


recomended power on time after x days of power off

@ OX-400-EAE-1080-20M000



## 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 ( $25^{\circ}\text{C}$ ).
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

### Europe:

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74924 Neckarbischofsheim  
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Fax: +49 (0) 7268.801.281



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