Oven Controlled Crystal Oscillator

**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

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**Performance Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typical</th>
<th>Max</th>
<th>Units</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>vs. operating temperature range (referenced to +25°C)</td>
<td>-5</td>
<td>+5</td>
<td>ppb</td>
<td>-40 to +85°C</td>
<td></td>
</tr>
<tr>
<td>vs. supply voltage change</td>
<td>-10</td>
<td>+10</td>
<td>ppb</td>
<td>V$_S$±5% static</td>
<td></td>
</tr>
<tr>
<td>vs. load change</td>
<td>-10</td>
<td>+10</td>
<td>ppb</td>
<td>Load ±5% static</td>
<td></td>
</tr>
<tr>
<td>vs. aging / day</td>
<td>-1.0</td>
<td>+1.0</td>
<td>ppb</td>
<td>after 30 days of operation</td>
<td></td>
</tr>
<tr>
<td>vs. aging / year</td>
<td>-100</td>
<td>+100</td>
<td>ppb</td>
<td>after 30 days of operation</td>
<td></td>
</tr>
<tr>
<td>vs. aging / 10 years</td>
<td>-1000</td>
<td>+1000</td>
<td>ppb</td>
<td>after 30 days of operation</td>
<td></td>
</tr>
</tbody>
</table>

| Hold over                                      |      |         |      |       |                                    |
| Start up time                                  |      |         |      |       |                                    |
| Warm-up time                                   | 3    | minutes |      | ±100ppb of final frequency (1 hour reading) @ +25°C |
### Performance Specifications

#### Supply Voltage (Vs)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typical</th>
<th>Max</th>
<th>Units</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (standard)</td>
<td>3.135</td>
<td>3.3</td>
<td>3.465</td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.75</td>
<td>5.0</td>
<td>5.25</td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
<td></td>
<td>2.5</td>
<td>Watts</td>
<td>during warm-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
<td>Watts</td>
<td>steady state @ +25°C</td>
</tr>
</tbody>
</table>

#### RF Output

<table>
<thead>
<tr>
<th>Signal [standard]</th>
<th>HCMOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>15</td>
</tr>
<tr>
<td>Signal Level (Vol)</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>Signal Level (Voh)</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>rise time</td>
<td>5</td>
</tr>
<tr>
<td>fall time</td>
<td>5</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>45</td>
</tr>
</tbody>
</table>

#### Frequency Tuning (EFC)

<table>
<thead>
<tr>
<th>Tuning Range</th>
<th>Fixed OCXO; No adjust</th>
<th>Opt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuning Range</td>
<td>±1.0</td>
<td>±3</td>
</tr>
<tr>
<td>Linearity</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Tuning Slope</td>
<td>Positive</td>
<td></td>
</tr>
<tr>
<td>Control Voltage Range</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Additional Parameters

| Phase Noise²                     | -85 dBc/Hz            | 1 Hz |
|                                  | -121 dBc/Hz           | 10 Hz|
|                                  | -140 dBc/Hz           | 100 Hz|
|                                  | -152 dBc/Hz           | 1 kHz|
|                                  | -155 dBc/Hz           | 10 kHz|
| Weight                           | 8.0 g                 |      |

### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Units</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>supply voltage (Vs)</td>
<td>5.5</td>
<td>V</td>
<td>with Vs=3.3 &amp; 5.0 VDC</td>
</tr>
<tr>
<td>Output Load</td>
<td>50</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Operable Temperature Range</td>
<td>-45</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-45</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>
**Outline Drawing / Enclosure**

### OX-400

**Height “H”**
- 8.5

**Pin Length “L”**
- 5.85 min.

### Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electronic Frequency Control Input (EFC)</td>
</tr>
<tr>
<td>7</td>
<td>Ground (Case)</td>
</tr>
<tr>
<td>8</td>
<td>RF Output</td>
</tr>
<tr>
<td>14</td>
<td>Supply Voltage Input</td>
</tr>
</tbody>
</table>

### OX-401

**Height “H”**
- 10.8

**Pin Length “L”**
- N/A

### Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
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<td>1</td>
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<td>RF Output</td>
</tr>
<tr>
<td>14</td>
<td>Supply Voltage Input</td>
</tr>
</tbody>
</table>

Dimensions in inches mm
### Standard Shipping Method (OX-401)

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Tape Width W (mm)</th>
<th>Quantity per meter</th>
<th>Quantity per reel</th>
<th>Dimension P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typ OX-401</td>
<td>32</td>
<td>50</td>
<td>250</td>
<td>20</td>
</tr>
</tbody>
</table>

### 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

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

<table>
<thead>
<tr>
<th>Typical case temperature vs outside temperature</th>
<th>Typical power consumption vs operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>@ OX-400-EAE-1080-20M000</td>
<td>@ OX-400-EAE-1080-20M000</td>
</tr>
</tbody>
</table>

![Temperature Test Chamber vs. Temperature](image1)

![Ambient temperature vs. Current](image2)

**Recommended power on time after x days of power off**

@ OX-400-EAE-1080-20M000
Ordering Information

**OX - 4000 - D A E - 108 0 - 10M0000000**

- **Product Family**: OX: OCXO
- **Supply Voltage**:
  - D: 5V
  - E: 3.3V
- **RF Output Code**: A: HCMOS
- **Frequency Control**:
  - 0: No Tuning
  - 2: ±1.0 to ±3.0ppm
- **Stability Code**:
  - 108: ±10ppb
  - 058: ±5ppb
- **Temperature Range**:
  - E: -40°C to +85°C
  - 8: -40°C to +95°C
- **Package & Height**:
  - THT version: 4000: 8.5 mm
  - SMD version: 4011: 10.8mm

**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.