Product Description

The 8410 TCXO is a crystal oscillator whose frequency drift due to operating temperature variation is reduced by means of an analog electronic compensation network.

The output of the 8410 has been designed using the latest low-power HCMOS technology making it ideal for portable applications. LSTTL, Open-collector or Sine wave outputs are also available to keep the compatibility with existing layouts.

On-board voltage regulation allows the TCXO to be powered from most common DC supplies and no significant changes are observed with load variations.

Features

- Frequency stability of \(\pm 0.5\text{ ppm}\) over \(0^\circ\text{C}\) to \(+60^\circ\text{C}\) and \(\pm 1\text{ ppm}\) over \(-20^\circ\text{C}\) to \(+70^\circ\text{C}\).
- Any power supply from +4.75 to +13.2 Volts
- Low current drain: typically 5 mA
- HCMOS, LSTTL or Open-collector outputs
- Wide operating temperature range up to \(-40^\circ\text{C}\) to \(+85^\circ\text{C}\)

Benefits

- Compatible with most requirements of civilian and military systems
- Eliminates the need for front-end DC/DC converter
- Ideal for man-pack/battery operated systems
- Easily interfaces with many different circuits
- Suitable for use in severe environmental conditions

TCXO 8410
Temperature Compensated Crystal Oscillator
## Technical Specification

### TCXO 8410

(maximum values given at +25°C, unless otherwise noted)

<table>
<thead>
<tr>
<th>Ordering models</th>
<th>8410-X-Y-Z / Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency range</strong></td>
<td>1 to 70 MHz</td>
</tr>
<tr>
<td><strong>Standard frequencies</strong></td>
<td>4.096 / 4.194304 / 5 / 8.192 / 10 / 13 / 16.384</td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>Up to -40°C to +85°C (see table 8410-X on page 3)</td>
</tr>
</tbody>
</table>

### Frequency stability (Δf/f)

- **Long term stability**: < ±1 ppm/first year and < ±0.5 ppm/following years
- **Over temperature range**: ±0.5 to ±5 ppm (see table 8410-X on page 3)
- **Versus supply voltage changes**: < ±0.1 ppm/Volt
- **Versus load changes**: (12 to 50 pF at 10 MHz), (10 to 15 pF >25 MHz)
  - < ±0.2 ppm

### Electronic frequency control

- > ±5 ppm (see table 8410-Y on page 3)

### Output specification

- **Compatibility**: HCMOS, LSTTL, Open-collector or Sine (see 8410-Z on page 3)
- **High/low level // load**: >3.5 V <0.5 V HCMOS 15pF or 2 TTL // Sin50 Ohms ±10% 0 dBm ±2 dB
- **Symmetry (at Vo = 2.5 V)**: 40 / 60% (45 / 55% for Fo <8 MHz)
- **Rise/Fall time (10% / 90%, 12pF)**: <10 ns
- **Open-collector f_max <15 MHz** (Vcc =+3 to +15 Volts)
  - Vcsat = +0.5 V at Ic <10 mA
  - Vcsat = +0.3 V at Ic < 5 mA
- **Phasenoise (Bw = 1Hz)**
  - 1 Hz: 50 dBc
  - 10 Hz: 80 dBc
  - 100 Hz: 110 dBc
  - typical at 5 MHz: 120 dBc
- **Power Supply**
  - **Input voltage range (DC)**: Any voltage between +4.75 and +13.2 Volts
  - **Current (no load)**: HCMOS: <7mA (f <20 MHz) <30mA / Sine: <20mA (f < 20 MHz) <40mA
  - **Humidity**: 95%, no condensation
  - **Storage temperature**: -40°C to +85°C (-55°C to +100°C on request)
  - **Vibration**: MIL-STD 202, method 204, condition A (10 to 500 Hz / 10 g)
  - **Shock**: MIL-STD 202, method 213B, condition J
  - **Pressure**: MIL-STD 202, method 105C, condition B (down to 11.7 KN/ m²)
  - **Size (L x W x H)**: 36.1 x 27.2 x 10.2 mm according to IEC reference CO 08 A
  - **Weight**: 20 g

In accordance with our policy of continuous development and improvement, we reserve the right to modify the design or the specifications of our products without prior notice.
Reference Tables for Ordering Models : 8410-X-Y-Z / Frequ. (MHz)

Table 8410-X  Stability over temperature range

<table>
<thead>
<tr>
<th>Ordering cross-reference (X)</th>
<th>A</th>
<th>B</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Standard</td>
<td>Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°/ +60°C</td>
<td>-20°/ +70°C</td>
<td>0°/ +60°C</td>
<td>-30°/ +70°C</td>
<td>-30°/ +85°C</td>
<td>-40°/ +85°C</td>
</tr>
<tr>
<td>Stability over temperature range</td>
<td>&lt;±1 ppm</td>
<td>&lt;±1 ppm</td>
<td>&lt;±0.5 ppm</td>
<td>&lt;±2 ppm</td>
<td>&lt;±3 ppm</td>
<td>&lt;±5 ppm</td>
</tr>
</tbody>
</table>

Table 8410-Y  Frequency control

<table>
<thead>
<tr>
<th>Ordering cross-reference (Y)</th>
<th>R1</th>
<th>R3</th>
<th>V5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Standard</td>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Means of frequency adjustment</td>
<td>External resistor</td>
<td>External Voltage control</td>
<td></td>
</tr>
<tr>
<td>Adjustment control</td>
<td>0 to 10 kΩ</td>
<td>0 to 10 kΩ</td>
<td>0 to 5 Volts</td>
</tr>
<tr>
<td>Pulling range</td>
<td>&gt;±5 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer function</td>
<td>Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>±10% Typ.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8410-Z  Output characteristics

<table>
<thead>
<tr>
<th>Ordering cross-reference (Z)</th>
<th>H</th>
<th>T</th>
<th>O</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification</td>
<td>Standard</td>
<td>Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output characteristic</td>
<td>Comp. HC-MOS</td>
<td>Comp. LSTTL</td>
<td>Open-collector</td>
<td>Sinewave</td>
</tr>
</tbody>
</table>

Pin-out connections

1: Vc input
2: V ref out (do not connect)
3: + Power supply
4: Output
5: GND
Ordering Information

Example:

TCXO 8410 - B - R1 - H / 5 MHz

Type

Model

Stability over temperature range (code X)
B: ±1 ppm over -20°C to +70°C

Frequency control (code Y)
R1: by external resistor (0 to 10kΩ)

Output level (code Z)
H: HCMOS output

Nominal frequency output
5 MHz

Applications

■ Mobile communications
■ Military and radio navigation man-pack and hand-held systems
■ Cellular/paging transceiver stations: BCS, BTS
■ Frequency synthesizers
■ Industrial/Scientific/Military test and measurement equipment
■ High density modem links
■ Clock timing and signal regeneration for Civilian/Military digital telecommunications equipment: Switching, MUX, PABX, DACS

Pin-out connections

1: Vc input
2: V ref out (do not connect)
3: + Power supply
4: Output
5: GND