Low Jitter LVPECL Clock Oscillator

Description:
The Connor-Winfield PBxxx series are 5.0x7.0mm Surface Mount, LVPECL output logic, Fixed Frequency Crystal Controlled Oscillator (XO) designed for applications requiring fine frequency stability, wide temperature range with very low jitter. Operating at 3.3V supply voltage, the PBxxx series provides LVPECL Differential Outputs with enable / disable function. The surface mount package is designed for high-density mounting and is optimum for mass production.

Applications:
40GB Ethernet and 100GB Ethernet reference clocks. High speed Data conversion, ADC, DAC Fiber channel Storage Area Networks, SANs

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum</th>
<th>Nominal</th>
<th>Maximum</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-55</td>
<td></td>
<td>125</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage (Vcc)</td>
<td>-0.5</td>
<td></td>
<td>4.6</td>
<td>Vdc</td>
<td></td>
</tr>
<tr>
<td>Input Voltage</td>
<td>-0.5</td>
<td></td>
<td>Vcc + 0.5</td>
<td>Vdc</td>
<td></td>
</tr>
</tbody>
</table>

Operating Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum</th>
<th>Nominal</th>
<th>Maximum</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Frequency; (Fo)</td>
<td>122.88</td>
<td></td>
<td>170</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Total Frequency Tolerance</td>
<td>-20</td>
<td></td>
<td>20</td>
<td>ppm</td>
<td>1</td>
</tr>
<tr>
<td>Model PBx43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model PBx13</td>
<td>-25</td>
<td></td>
<td>25</td>
<td>ppm</td>
<td>1</td>
</tr>
<tr>
<td>Model PBx23</td>
<td>-50</td>
<td></td>
<td>50</td>
<td>ppm</td>
<td>1</td>
</tr>
<tr>
<td>Model PBx33</td>
<td>-100</td>
<td></td>
<td>100</td>
<td>ppm</td>
<td>1</td>
</tr>
</tbody>
</table>

| Operating Temperature Range | -0.5     |         | -        | ppm   | 2     |
| Supply Voltage; (Vcc)       | 3.135    | 3.3     | 3.465    | Vdc   |       |
| Supply Current; (Icc)       | -40      | 50      | mA       |       |       |

Jitter:
- Period Jitter: 3.0, 5.0 ps RMS
- Integrated Phase Jitter: 0.060, 0.1, ppm 2

SSB Phase Noise: Fo = 156.25 MHz
- 10 Hz offset: -65 dBc/Hz
- 100 Hz offset: -90 dBc/Hz
- 1 Khz offset: -118 dBc/Hz
- 10 Khz offset: -141 dBc/Hz
- 100 Khz offset: -156 dBc/Hz
- 1 MHz offset: -161 dBc/Hz

Start-Up Time: 2 ms

LVPECL Output Characteristics

<table>
<thead>
<tr>
<th>Load</th>
<th>-</th>
<th>50</th>
<th>-</th>
<th>Ohm</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage</td>
<td>(High)</td>
<td>Vcc = 3.3 V</td>
<td>Voh</td>
<td>2.275</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Low)</td>
<td>Vcc = 3.3 V</td>
<td>Vol</td>
<td>1.680</td>
<td></td>
</tr>
<tr>
<td>Duty Cycle: at 50% Level</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>%</td>
<td>5</td>
</tr>
<tr>
<td>Rise / Fall Time: 20% to 80%</td>
<td>0.3</td>
<td>1.0</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering Information

Example: Part Number
PB223-156.25M = LVPECL Output,-40 to 85, ±50ppm, 3.3Vdc, OE Pad 1, Output Frequency 156.25 MHz
**OE Input Characteristics**

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<tbody>
<tr>
<td>Enable Input Voltage: (High) (Vih)</td>
<td>90%Vcc</td>
<td>-</td>
<td>-</td>
<td>Vdc</td>
<td>3</td>
</tr>
<tr>
<td>Disable Input Voltage: (Low) (Vil)</td>
<td>-</td>
<td>-</td>
<td>10%Vcc</td>
<td>Vdc</td>
<td>3</td>
</tr>
<tr>
<td>Enable Time:</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>ms</td>
<td></td>
</tr>
<tr>
<td>Disable Time:</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Standby Current: (When Osc. is disabled)</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>mA</td>
<td></td>
</tr>
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**Package Characteristics**

- Hermetically sealed ceramic package and metal cover

**Environmental Characteristics**

- Vibration: per Mil Std 883E Method 2007.3 Test Condition A.
- Shock: Mechanical Shock per Mil Std 883E Method 2002.4 Test Condition B.
- Soldering Process: RoHS compliant lead free. See soldering profile on page 2 below.

**Notes:**

1. Includes calibration @ 25°C, frequency stability vs. change in temperature, supply voltage and load variations, shock and vibration and 20 years aging.
2. Frequency stability vs. change in supply voltage, Vcc+/-5% @ 25°C.
3. When the oscillator is disabled the outputs are at high impedance. Outputs are enabled with no connection on E/D pad.
4. Outputs must be terminated into 50 ohms to Vcc – 2V or Thevenin equivalent.
5. Duty cycle measured at 50% output voltage swing.

**Package Outline**

![Package Outline Diagram]

Dimension H = 1.47mm ±0.2mm for all 156.25M part numbers
Dimension H = 1.75mm ±0.2mm for all frequencies other than 156.25M

**Suggested Pad Layout**

![Suggested Pad Layout Diagram]

**Output Waveform**

![Output Waveform Diagram]

**Solder Profile**

- Meets IPC/JEDEC J-STD-020C

**OE Enable / Disable Function**

- Function: Output
- Low: Disabled (High Impedance)
- High or Open: Enabled

**Pad Connections**

1: Enable / Disable (OE)
2: N/C
3: Ground
4: Output Q
5: Complementary Output Q
6: Supply Voltage (Vcc)

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