CMOS/LVCMOS HF VCTCXO
AB-XC3XXX-X Series

Description
The AB-XC3XXX Series of voltage controlled, temperature compensated crystal oscillators (VCTCXO) provides high frequency with CMOS/LVCMOS output. The outputs can be tristated for test automation or combining multiple clocks. The device does not use any frequency multiplication, providing exceptionally low Phase Noise and Jitter. It’s packaged in a miniature, FR-4 based 9x14 mm SMD package.

Applications and Features
- Fiber Channel; 10 GbE; Infiniband; Network Processors; SONET/SDH
- High Reliability – NEL HALT/HASS qualified for crystal oscillator start-up conditions
- Extremely Low Phase Noise and Jitter
- No Multiplication
- Frequency Stability from ± 5 ppm
- High Shock Resistance, to 1000g
- COTS/Dual use

Creating a Part Number

<table>
<thead>
<tr>
<th>Package code</th>
<th>AB - X C3 X X X - FREQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>6 pad 9x14x 6.1mm SMD</td>
</tr>
</tbody>
</table>

Operating Voltage
- 0  5.0 V ± 5%
- A  3.3 V ± 5%
- B  2.5 V ± 5%
- C  1.8 V ± 5%

Tristate Option
- T - tristate
- N – N/A

Environmental
- L  Contains a level of lead that is in excess of RoHS directive and is not designed for reflow
- R  RoHS compliant

Temp. Stability, ppm, 5 ±5

Temperature Range, ºC
- A – 0 to 50
- B - 0 to 70
- C - -20 to 70
- 9 – customer specific
CMOS/LVCMOS HF VCTCXO
AB-XC3XXX-X Series

Drawing Specification

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature Range</td>
<td>To</td>
<td>-40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tst</td>
<td>-50 to +90</td>
<td>°C</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td>-0.5 to 5.5</td>
<td>V</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>Vc</td>
<td>-0.5 to 5.5</td>
<td>V</td>
</tr>
<tr>
<td>Enable/Disable Voltage</td>
<td>Ven/dis</td>
<td>0 to Vcc</td>
<td>V</td>
</tr>
</tbody>
</table>
## CMOS/LVCMOS HF VCTCXO
### AB-XC3XXX-X Series

#### Electrical Parameters (1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symb</th>
<th>Conditions, Note</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Frequency</td>
<td>Fo</td>
<td></td>
<td>12</td>
<td>125</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td>Code 0</td>
<td>4.75</td>
<td>5.0</td>
<td>5.25</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Code A</td>
<td>3.135</td>
<td>3.3</td>
<td>3.465</td>
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<tr>
<td></td>
<td></td>
<td>Code B</td>
<td>2.375</td>
<td>2.5</td>
<td>2.625</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Code C</td>
<td>1.71</td>
<td>1.8</td>
<td>1.89</td>
<td></td>
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<tr>
<td>Supply current</td>
<td>Icc</td>
<td>No load, Vcc = 3.3 V</td>
<td>40 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Logic Type</td>
<td></td>
<td>CMOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Load</td>
<td></td>
<td>15 pf/10 KOhm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Levels</td>
<td></td>
<td>Voh, Vol overall</td>
<td>0.9 Vcc</td>
<td>0.1 Vcc</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Duty Cycle (Symmetry)</td>
<td></td>
<td>At 50% Vcc</td>
<td>45/55</td>
<td>50/50</td>
<td>55/45</td>
<td>%</td>
</tr>
<tr>
<td>Rise/Fall Time</td>
<td></td>
<td>Tr/Tf</td>
<td>0.2 Vcc to 0.8 Vcc;</td>
<td>3</td>
<td>5</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F&lt; 70 MHz</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 MHz&lt;F&lt;125 MHz</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Jitter @ 50 MHz</td>
<td>Int.</td>
<td>Integrated from Phase Noise, 12 KHz to 20 MHz, RMS</td>
<td>0.1</td>
<td>0.15</td>
<td>ps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 Hz to 80 KHz, RMS</td>
<td>0.8</td>
<td>ps</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>50 KHz to 80 MHz</td>
<td>0.2</td>
<td>ps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavecrest characterized</td>
<td>Random period,</td>
<td>2.5</td>
<td>ps</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Accumul., pk-to-pk</td>
<td>17</td>
<td>ps</td>
<td></td>
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<tr>
<td></td>
<td>Determin.</td>
<td>0</td>
<td>ps</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sub-harmonics</td>
<td></td>
<td>None</td>
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<td></td>
<td></td>
<td>dBC</td>
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<tr>
<td>Phase Noise</td>
<td>f(Δf)</td>
<td>50 MHz, @ 10 Hz</td>
<td>-85</td>
<td>-80</td>
<td>dBC/Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 100 Hz</td>
<td>-115</td>
<td>-110</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>@ 1 KHz</td>
<td>-145</td>
<td>-140</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 10 KHz</td>
<td>-160</td>
<td>-155</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>@ 100 KHz</td>
<td>-165</td>
<td>-160</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ &gt; 1 MHz</td>
<td>-165</td>
<td>-160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency Stability</td>
<td>ΔF/F</td>
<td>Over Temperature, Calibration @ Vcc/2, Aging 10 years Shock and vibration Reflow</td>
<td>±1</td>
<td>From ±5</td>
<td>ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Control Voltage Range</td>
<td>Vc</td>
<td>Vc to set the F at Fo; T, Vcc, load – nominal, as shipped</td>
<td>0.4 Vcc</td>
<td>0.5 Vcc</td>
<td>0.6 Vcc</td>
<td>V</td>
</tr>
<tr>
<td>Setability</td>
<td>Vcs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute Pull Range</td>
<td>APR</td>
<td>Over all conditions</td>
<td>±10</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>Zin</td>
<td>@ Fmod &lt; 10 KHz</td>
<td>50</td>
<td>KOhm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulation Bandwidth</td>
<td></td>
<td>At Vc = Vcc/2, -3dB</td>
<td>20</td>
<td>KHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable</td>
<td></td>
<td>Pin 2 = High, or floating</td>
<td>Enabled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disable</td>
<td></td>
<td>Pin 2 = Low</td>
<td>Tri-stated, output – high Z</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1. All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal Load.
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Environmental and Mechanical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temp. range</td>
<td>see part # table</td>
</tr>
<tr>
<td>Mechanical Shock</td>
<td>Per MIL-STD-202, Method 213, Cond. A</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>Per MIL-STD-883, Method 1011, Cond. A</td>
</tr>
<tr>
<td>Vibration</td>
<td>Per MIL-STD-883, Method 2007, Cond. A</td>
</tr>
<tr>
<td>Hermetic Seal</td>
<td>Leak rate less than $5 \times 10^{-8}$ atm.cc/s of helium, crystal only.</td>
</tr>
<tr>
<td>Soldering conditions</td>
<td>See MAX reflow profile below; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended</td>
</tr>
</tbody>
</table>

MAX Reflow Profile

The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended