Voltage Controlled Oscillator (VCO) From 4 GHz to 8 GHz, Phase Noise of -95 dBC/Hz and SMA

Voltage Control Oscillators Technical Data Sheet

PE1V34000

Features
- VCO Module with Integrated Buffer Amplifier
- GaAs MMIC Technology
- Wide Tuning Bandwidth
- Vtune Range 0V to +18V
- High Output Power +20 dBm
- SSB Phase Noise -95 dBC/Hz @100Hz offset
- Single Positive Supply +8V to +15V
- Regulated Voltage Supply
- Hermetically Sealed Module
- Mil Spec Compliant
- Field Replaceable SMA Connectors
- -40°C to +85°C Operating Temperature

Applications
- Electronic Warfare
- Electronic Countermeasures
- Microwave Radio
- Radar
- Industrial
- Medical Equipment
- Test Instrumentation
- Lab Instrumentation

Description
The PE1V34000 Voltage Controlled Oscillator operates across the frequency range of 4 GHz to 8 GHz. The design utilizes leading edge GaAs MMIC technology which incorporates the resonator, negative resistance device, and varactor diode. An internal voltage regulator provides excellent frequency pushing of 0.2 MHz/V. The design also incorporates an output buffer amplifier that provides output power up to +20 dBm. Phase noise performance is stable over temperature at -95 dBC/Hz @100 KHz offset, with a tuning voltage range of 0 to +18 Volts. Bias is from a single +12V DC supply. The drop-in package is hermetically sealed with field replaceable SMA connectors and has an operating temperature range of -40°C to +85°C. And for added confidence, this rugged package assembly is designed to meet MIL-STD-883 test conditions for Hermeticity and Temperature Cycle.

Electrical Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>4</td>
<td>8</td>
<td></td>
<td>GHz</td>
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<tr>
<td>Tuning Voltage</td>
<td>0</td>
<td>18</td>
<td></td>
<td>Vdc</td>
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<tr>
<td>Supply Voltage (DC)</td>
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<td></td>
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</tr>
<tr>
<td>Supply Current (DC)</td>
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<td></td>
<td>195</td>
<td>mA</td>
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<tr>
<td>Tune Port Leakage Current</td>
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<td>0.01</td>
<td>mA</td>
</tr>
<tr>
<td>Phase Noise @ 10kHz Offset</td>
<td>-75</td>
<td></td>
<td></td>
<td>dBC/Hz</td>
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<tr>
<td>Phase Noise @ 100kHz Offset</td>
<td>-95</td>
<td></td>
<td></td>
<td>dBC/Hz</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>15</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Output Power</td>
<td>+17</td>
<td>+20</td>
<td></td>
<td>dBm</td>
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<tr>
<td>Pushing</td>
<td>0.2</td>
<td></td>
<td></td>
<td>MHz/V</td>
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<tr>
<td>2nd Harmonics</td>
<td>-10</td>
<td></td>
<td></td>
<td>dBC</td>
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**Voltage Controlled Oscillator (VCO) From 4 GHz to 8 GHz, Phase Noise of -95 dBC/Hz and SMA**

### Performance by Frequency

<table>
<thead>
<tr>
<th>Description</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>4.0</td>
<td>5.0</td>
<td>8.0</td>
<td>5.0</td>
<td>6.0</td>
<td>8.0</td>
<td>GHz</td>
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<tr>
<td>Power Output</td>
<td>13</td>
<td>15</td>
<td>17</td>
<td>17</td>
<td>20</td>
<td>20</td>
<td>dBm</td>
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<tr>
<td>SSB Phase Noise @ 100 KHz Offset</td>
<td>-95</td>
<td>-95</td>
<td>-95</td>
<td>-95</td>
<td>-95</td>
<td>-95</td>
<td>dBc/Hz</td>
</tr>
<tr>
<td>SSB Phase Noise @ 10 KHz Offset</td>
<td>-75</td>
<td>-75</td>
<td>-75</td>
<td>-75</td>
<td>-75</td>
<td>-75</td>
<td>dBc/Hz</td>
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<tr>
<td>Tune Voltage (Vtune)</td>
<td>0</td>
<td>18</td>
<td>3</td>
<td>18</td>
<td>3</td>
<td>18</td>
<td>V</td>
</tr>
<tr>
<td>Supply Current (I_dc) (V_dc = +12V)</td>
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<td>185</td>
<td>185</td>
<td>185</td>
<td>185</td>
<td>185</td>
<td>mA</td>
</tr>
<tr>
<td>Tune Port Leakage Current (Vtune = +15V)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>μA</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>15</td>
<td>15</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
<td>dB</td>
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<td>2nd Harmonic</td>
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<td>-10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>MHz pp</td>
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<tr>
<td>Pulling (Into A 2.0:1 VSWR)</td>
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<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>MHz/V</td>
</tr>
<tr>
<td>Pushing @ Vtune = +5V</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>MHz/°C</td>
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<tr>
<td>Frequency Drift Rate</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>MHz/°C</td>
</tr>
</tbody>
</table>

### Mechanical Specifications

**Size**

- Length: 0.64 in [16.26 mm]
- Width: 0.7 in [17.78 mm]
- Height: 0.29 in [7.37 mm]
- Weight: 0.056 lbs [25.4 g]

**Configuration**

- Design: Commercial
- Connector Option: Field Replaceable
- Control Connector: SMA Female
- Output Connector: SMA Female

### Environmental Specifications

**Temperature**

- Operating Range: -40 to +85 deg C
- Storage Range: -65 to +150 deg C

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Temperature Cycle
MIL-STD-883, Method 101C, Cond B
Hermetic Seal
Gross Leak MIL-STD-883 Method 1014C1/Fine Leak
MIL-STD-883, Method 1014A2, 5 x 10-8 atm cc
ESD Sensitivity
ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in ESD Workstation.

Compliance Certifications (see product page for current document)

Plotted and Other Data
Notes:

Functional Block Diagram

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Typical Performance Data

SSB Phase Noise vs. Tuning Voltage

Typical SSB Phase Noise

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URL: https://www.pasternack.com/voltage-controlled-oscillator-vco-8-ghz-pe1v34000-p.aspx

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