MAOC-109173

Voltage Controlled Oscillator
8805 - 9542 MHz

Features
- Phase Noise: -88/-117dBc/Hz @ 10/100kHz
- Wide Tuning Range
- Low Current Consumption: 90 mA
- Excellent Temperature Stability
- Proven Microphonic Performance
- +5 V Bias
- Lead-Free 5 mm 32-Lead Package
- RoHS* Compliant and 260°C Reflow Compatible

Description
The MAOC-109173 is a voltage controlled oscillator for frequency generation. No external matching components are required. This VCO is easily integrated into a phase lock loop using the divide-by-two output. The extremely low phase noise makes this part ideal for many radio applications including high capacity digital radios.

The MAOC-109173 primary applications are Point-to-Point Radio, Point-to-Multipoint Radio, Communications Systems, and Low Phase Noise applications.

The 5 mm package has a lead-free finish that is RoHS compliant and compatible with a 260°C reflow temperature. The package features low lead inductance and an excellent thermal path.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAOC-109173-TR0500</td>
<td>500 piece reel</td>
</tr>
<tr>
<td>MAOC-109173-TR1000</td>
<td>1000 piece reel</td>
</tr>
<tr>
<td>MAOC-109173-SMB</td>
<td>Sample Board</td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.

2. Connecting all N/C pins to RF/DC ground in the layout is also recommended.
3. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

For further information and support please visit:
https://www.macom.com/support

Visit www.macom.com for additional data sheets and product information.
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Electrical Specifications: \( T_A = +25^\circ C, V_{CC} = 5.0 \, V \), \( Z_0 = 50 \, \Omega \)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power</td>
<td>RF Port, 8805 - 9542MHz, RF Port, 4402.5 - 4771MHz.</td>
<td>dBm</td>
<td>5</td>
<td>9</td>
<td>—</td>
</tr>
<tr>
<td>SSB Phase Noise</td>
<td>RF Port, 10 kHz Offset, 8805 - 9542MHz, RF Port, 100 kHz Offset, 8805 - 9542MHz.</td>
<td>dBC/Hz</td>
<td>—</td>
<td>-88</td>
<td>-117</td>
</tr>
<tr>
<td>Harmonics/Subharmonics</td>
<td>RF Port, ( \frac{1}{2} F_0 ), RF Port, ( \frac{3}{2} F_0 ), RF Port, 2( F_0 ), RF Port, 2( F_0 ), RF Port, 3( F_0 ), RF/2 Port, 2( F_0 ), RF/2 Port, 3( F_0 ).</td>
<td>dBC</td>
<td>—</td>
<td>-28.0</td>
<td>-37.0</td>
</tr>
<tr>
<td>Pulling (Sensitivity to Match)</td>
<td>RF Port, VSWR = 1.95:1 to 2.25:1.</td>
<td>MHz pk-pk</td>
<td>—</td>
<td>6.6</td>
<td>—</td>
</tr>
<tr>
<td>Pushing (Sensitivity to Supply Voltage)</td>
<td>RF Port, ( V_\text{TUNE} = 5 , V ), RF/2 Port, ( V_\text{TUNE} = 5 , V ).</td>
<td>MHz/V</td>
<td>—</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Frequency Drift Rate (Sensitivity to Temperature)</td>
<td>RF Port, 8805 - 9542 MHz, RF/2 Port, 4402.5 - 4771 MHz.</td>
<td>MHz/(^\circ)C</td>
<td>—</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>RF Port, 8805 - 9542 MHz, RF/2 Port, 4402.5 - 4771 MHz.</td>
<td>dB</td>
<td>—</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Tuning Sensitivity @ RF Port</td>
<td>( V_\text{TUNE} = 5 , V ).</td>
<td>GHz/V</td>
<td>—</td>
<td>0.17</td>
<td>—</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>( V_\text{CC} ).</td>
<td>Vdc</td>
<td>4.75</td>
<td>5.0</td>
<td>5.25</td>
</tr>
<tr>
<td>Supply Current</td>
<td>( I_{CC} ).</td>
<td>mA</td>
<td>—</td>
<td>90</td>
<td>—</td>
</tr>
<tr>
<td>Tune Voltage</td>
<td>( V_\text{TUNE} ).</td>
<td>V</td>
<td>2</td>
<td>—</td>
<td>11.5</td>
</tr>
<tr>
<td>Tuning Current Leakage</td>
<td>( V_\text{TUNE} = 13 , V ).</td>
<td>( \mu A )</td>
<td>—</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

4. VCO can operate over the 4.75 V to 5.25 V supply voltage range.

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_\text{CC} )</td>
<td>+5.5 V</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55°C to +150°C</td>
</tr>
<tr>
<td>Operating Temperature ( T_\text{op} )</td>
<td>-40°C to +85°C</td>
</tr>
</tbody>
</table>

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these HBM Class 1C devices.

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8805 - 9542 MHz

Typical Performance Curves: $V_{CC} = 5\,\text{V}$, $T_A = +25^\circ\text{C}$ (unless otherwise indicated)

Output Frequency vs. Tune Voltage - RF Port

Output Frequency vs. Tune Voltage - RF/2 Port

Output Frequency vs. Tune/Supply Voltage - RF Port

Output Frequency vs. Tune/Supply Voltage - RF/2 Port

Output Power vs. Tune Voltage - RF Port

Output Power vs. Tune Voltage - RF/2 Port
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**Frequency Sensitivity vs. Tune Voltage - RF Port**

**Phase Noise vs. Tune Voltage - RF Port**

**Frequency Sensitivity vs. Tune Voltage - RF/2 Port**

**Phase Noise vs. Frequency Offset - RF Port \( (V_{TUNE}=5\text{V}) \)**
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