NLTL Comb Generator

MLPNC-7100
Rev. V5

Features
- Ultra-Low Phase Noise
- Variable Input Frequency 100 - 400 MHz
- Variable Input Power from 18 - 24 dBm
- Output Harmonics to 20 GHz
- SMA850 Hermetic Package
- No Bias or Tuning Required
- RoHS* Compliant

Description
The MLPNC-7100 is a low phase noise comb generator (LPNC) with a flexible range of input frequency and power. It is based on monolithic non-linear-transmission-line (NLTL) circuit technology and it’s banner spec is its ultra-low phase noise. The phase noise shown is at the 120th harmonic (12 GHz) and at any other harmonic it can be calculated using the analytical equation \( P \text{NN} = P \text{NN,120} - 20 \log(120 – N) \) for \( N < 120 \). It is available in a coaxial package.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLPNC-7100-SMA850</td>
<td>ESD Box with Foam</td>
</tr>
</tbody>
</table>

Operating Parameters: Recommended Input1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>MHz</td>
<td>100</td>
<td>250</td>
<td>400</td>
</tr>
<tr>
<td>Power</td>
<td>dBm</td>
<td>18</td>
<td>22</td>
<td>24</td>
</tr>
</tbody>
</table>

1. The model MLPNC-7100 does not abruptly stop working at the recommended min and max frequencies and powers. The conversion efficiency drops outside recommended limits.

Production Test Limits: Output Harmonics

<table>
<thead>
<tr>
<th>MLPNC-7100-SMA850 Input / Power</th>
<th>Units</th>
<th>4 GHz</th>
<th>8 GHz</th>
<th>12 GHz</th>
<th>16 GHz</th>
<th>20 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 MHz, 22 dBm</td>
<td>dBm</td>
<td>&gt; -23</td>
<td>&gt; -26</td>
<td>&gt; -35</td>
<td>&gt; -43</td>
<td>&gt; -55</td>
</tr>
<tr>
<td>250 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -11</td>
<td>&gt; -18</td>
<td>&gt; -25</td>
<td>&gt; -38</td>
<td>&gt; -43</td>
</tr>
<tr>
<td>400 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -8</td>
<td>&gt; -18</td>
<td>&gt; -25</td>
<td>&gt; -35</td>
<td>&gt; -45</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings2,3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>27 dBm</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-45°C to +85°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55°C to +125°C</td>
</tr>
<tr>
<td>Temperature Cycling</td>
<td>-55°C to +125°C</td>
</tr>
</tbody>
</table>

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. MACOM does not recommend sustained operation near these survivability limits.

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

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Typical Performance Curves using SMA package @ 100 MHz Input:

**Harmonic Output, @ P_{IN} = 18 dBm**

- Plot showing harmonic power vs. harmonic frequency for different harmonic orders.

**Harmonic Output, @ P_{IN} = 20 dBm**

- Plot showing harmonic power vs. harmonic frequency for different harmonic orders.

**Harmonic Output, @ P_{IN} = 22 dBm**

- Plot showing harmonic power vs. harmonic frequency for different harmonic orders.

**Harmonic Output, @ P_{IN} = 24 dBm**

- Plot showing harmonic power vs. harmonic frequency for different harmonic orders.

**Phase Noise, 22 dBm P_{IN} 12 GHz Output**

- Plot showing phase noise in dBc/Hz vs. offset frequency for different output harmonics.
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Typical Performance Curves using SMA package @ 250 MHz Input:

- **Harmonic Output, @ $P_{in} = 18$ dBm**
  - @ 25°C
  - @ 40°C
  - @ 65°C

- **Harmonic Output, @ $P_{in} = 20$ dBm**
  - @ 25°C
  - @ 40°C
  - @ 65°C

- **Harmonic Output, @ $P_{in} = 22$ dBm**
  - @ 25°C
  - @ 40°C
  - @ 65°C

- **Harmonic Output, @ $P_{in} = 24$ dBm**
  - @ 25°C
  - @ 40°C
  - @ 65°C
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Typical Performance Curves using SMA package @ 400 MHz Input:

Harmonic Output, @ $P_{IN} = 18$ dBm

Harmonic Output, @ $P_{IN} = 20$ dBm

Harmonic Output, @ $P_{IN} = 22$ dBm

Harmonic Output, @ $P_{IN} = 24$ dBm
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Outline: SMA850, hermetic

Dimensions in inches [mm]
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