## MLPNC-7100

### NLTL Comb Generator

#### Features
- Ultra-Low Phase Noise
- Variable Input Frequency 100 - 400 MHz
- Variable Input Power from 18 - 24 dBm
- Output Harmonics to 20 GHz
- SMT680 Surface Mount Package
- 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 nonlinear-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 

\[ P_{NN} = P_{120} - 20 \log (120 - N) \]

\( N < 120 \). It is available in both coaxial and surface mount packages.

#### 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>
<tr>
<td>MLPNC-7100-SMT680</td>
<td>ESD Box with Foam</td>
</tr>
</tbody>
</table>

#### Operating Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Recommended Input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Typ.</td>
</tr>
<tr>
<td>Frequency</td>
<td>MHz</td>
<td>100</td>
</tr>
<tr>
<td>Power</td>
<td>dBm</td>
<td>18</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

<table>
<thead>
<tr>
<th>MLPNC-7100-SMA850 Input / Power</th>
<th>Units</th>
<th>Output Harmonics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4 GHz</td>
</tr>
<tr>
<td>100 MHz, 22 dBm</td>
<td>dBm</td>
<td>&gt; -23</td>
</tr>
<tr>
<td>250 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -11</td>
</tr>
<tr>
<td>400 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MLPNC-7100-SMT680 Input / Power</th>
<th>Units</th>
<th>Output Harmonics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4 GHz</td>
</tr>
<tr>
<td>100 MHz, 22 dBm</td>
<td>dBm</td>
<td>&gt; -23</td>
</tr>
<tr>
<td>250 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -11</td>
</tr>
<tr>
<td>400 MHz, 20 dBm</td>
<td>dBm</td>
<td>&gt; -8</td>
</tr>
</tbody>
</table>

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

MACOM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit [www.macom.com](https://www.macom.com) for additional data sheets and product information.
### Typical Performance Curves using SMA package @ 100 MHz Input:

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

![Harmonic Output, @ $P_{IN} = 18$ dBm](image1)

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

![Harmonic Output, @ $P_{IN} = 20$ dBm](image2)

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

![Harmonic Output, @ $P_{IN} = 22$ dBm](image3)

#### Harmonic Output, @ $P_{IN} = 24$ dBm

![Harmonic Output, @ $P_{IN} = 24$ dBm](image4)

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

![Phase Noise, 22 dBm $P_{IN}$, 12 GHz Output](image5)

### Absolute Maximum Ratings$^{2,3}$

<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.
Typical Performance Curves using SMA package @ 250 MHz Input:

**Harmonic Output, @ $P_{in} = 18$ dBM**

![Graph](image1)

**Harmonic Output, @ $P_{in} = 20$ dBM**

![Graph](image2)

**Harmonic Output, @ $P_{in} = 22$ dBM**

![Graph](image3)

**Harmonic Output, @ $P_{in} = 24$ dBM**

![Graph](image4)
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
Typical Performance Curves using SMT package @ 100 MHz Input:

**Harmonic Output, @ P\text{in} = 18 dBm**

![Graph showing harmonic output at 18 dBm input power.]

**Harmonic Output, @ P\text{in} = 20 dBm**

![Graph showing harmonic output at 20 dBm input power.]

**Harmonic Output, @ P\text{in} = 22 dBm**

![Graph showing harmonic output at 22 dBm input power.]

**Harmonic Output, @ P\text{in} = 24 dBm**

![Graph showing harmonic output at 24 dBm input power.]

MACOM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.
Typical Performance Curves using SMT package @ 250 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

MACOM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Visit www.macom.com for additional data sheets and product information.

For further information and support please visit: https://www.macom.com/support
Typical Performance Curves using SMT 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
Outline: SMT680

Top View

Side View

Bottom View

Dimensions in inches [mm]
Outline: SMA850, hermetic

Dimensions in inches [mm]
MACOM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with MACOM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.