**Preliminary XcutLNSSB-SC Modulator**

### Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>T.SBX1.5-10-ADC-Y-Z</td>
</tr>
<tr>
<td>Modulation Speed</td>
<td>10Gbit/s</td>
</tr>
<tr>
<td>Operating wavelength</td>
<td>1.55µm</td>
</tr>
<tr>
<td>Insertion loss@DC</td>
<td>&lt;=7.0dB</td>
</tr>
<tr>
<td>Optical bandwidth&lt;sup&gt;1&lt;/sup&gt;</td>
<td>&gt;=10GHz</td>
</tr>
<tr>
<td>Electrical bandwidth&lt;sup&gt;2&lt;/sup&gt;</td>
<td>&gt;=8dB</td>
</tr>
<tr>
<td>Suppressed Carrier Ratio</td>
<td>&gt;=20dB</td>
</tr>
<tr>
<td>Maximum input power</td>
<td>10mW</td>
</tr>
<tr>
<td>Electrode impedance</td>
<td>50Ω</td>
</tr>
<tr>
<td>RF connector</td>
<td>K connector (SMA)</td>
</tr>
<tr>
<td>Optical fiber</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>0.9mmΦ PMF</td>
</tr>
<tr>
<td>Output</td>
<td>0.9mmΦ PMF or SMF</td>
</tr>
<tr>
<td>Fiber lead length</td>
<td>at each port 1.0~2.0m</td>
</tr>
</tbody>
</table>

<sup>*1:* each sub MZ  
<sup>*2:* 3dB down (130MHz reference)

### Ordering Information

**T.SBX1.5 - 10 - ADC**

- **Y**: Output Optical fiber<sup>1</sup>
  - 0.9mmΦ PMF: P
  - 0.9mmΦ SMF: S
  - Other: O

- **Z**: Connector<sup>1,2</sup>
  - FC/SPC without key ring: FN
  - FC/SPC with key ring: FK
  - SC/SPC: SC
  - SC/APC(Angled PC): FA
  - Other: O

<sup>*1:* When Other O is selected in the above ordering code, please specify your requirements with as much detail as possible.  
<sup>*2:* The Polarization state of input and/or output PMF is slow axis aligned.

### Package size (Hermetically-sealed)

- **Dimensions:**
  - L: 130mm
  - W: 34.9mm
  - H: 47.1±0.02mm
  - M2.5 x 2 Mounting Hole

- **Fiber lead length:**
  - 1.0~2.0m at each port

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*Manufactured by: SUMITOMO OSAKA CEMENT CO., LTD.  
OPTOELECTRONICS BUSINESS DIVISION*


XcutLNSSB-SC Modulator

**Recommended configuration**

* This recommended configuration is only for giving general ideas. Please refer to the operation manual which is included with the product when you use the product. The operation manual shows you the appropriate way to use with any note.

(1) For proper adjustment, make optical connection prior to electrical connection otherwise the product may get damage.

The optical connection between the product and a power meter, or between the product and a laser source should be made when laser source is off.

⚠️ Any risk of making connection while laser source is working, such as loss of eye-sight, should be at the user.

(2) The input fiber of the modulator must be optically adjusted with an optical laser source.

The schematic diagram is illustrated below.

(3) The output fiber of the modulator must be optically adjusted with a power meter.

The schematic diagram is illustrated below.

(4) You can work the laser source.

(5) Adjust the input side connector appropriately so that the input light power to the module is maximized.

The internal polarizer will get damage by improper adjustment and cause unexpected optical loss.

(6) DC Supply is connected. The schematic diagram is illustrated below.

*This product is a AC(RF)/DC separated type, thus you do not need Bias T, DC Block and Termination.
XcutLNSSB-SC Modulator

How the SSB (Single Side Band) Modulator works

SSB Modulator has optical Ti-diffused wave-guide paths which form nested Mach-Zender structure. Each of the two primary arms contains sub MZ structures. Two RF ports are for modulation and three DC ports are for bias the two sub MZ and one primary MZ. The modulator consists of LiNbO3 crystal which is X-Cut Y-propagation, where you can produce a SSB Modulation just by driving each MZ. (See Fig.1)

![Fig1](image)

\(\Phi_1(t) = \Phi \cos \Omega t\) is entered from RFA, and \(\Phi_2(t) = \Phi \sin \Omega t\) it is entered from RFB by using the wide band 90 degrees Phase Shifter.

*\(\Phi\): Modulation Level, \(\Omega\): Angular Frequency

Fig2 shows the spectrum on each frequency at each point.

![Fig2](image)