40Gb/s 2R Optical Regenerator (wavelength converter)

Features
- 40Gb/s Operation
- Low switching energies (<100fJ per pulse per SOA)
- C Band operation (1530-1565nm)
- World-leading low assembly loss (<5dB fibre to fibre)

Applications
- Wavelength conversion,
- 2R regeneration
- Optical logic element

Description
The optical regenerator is an innovative high-speed optical switch that provides all-optical wavelength conversion at data rates up to 40Gb/s. It has applications in 2R regeneration and as an optical logic gate. The optical module is a hybrid integrated device consisting of a passive, planar silica balanced Mach-Zehnder interferometer with non-linear semiconductor optical amplifiers (SOAs) assembled in each interferometer arm. The SOAs are mode expanded to efficiently couple light to the single mode silica waveguides (coupling loss <1dB). The module includes eight fibre pigtails, a Peltier cooler and electrical connections for thermal phase shifters.

Research results for this type of device have been published for applications in 40Gb/s optical 2R regeneration [1] and 40Gb/s XOR optical logic [2]. The overall module exhibits world-leading low assembly loss (<5dB fibre-to-fibre, excluding SOA gain) and excellent system performance. Typical switching energies are very low (<100fJ per pulse into each SOA) and current modules operate over the C-band (1530-1565nm).


CIP Technologies can supply this device as a research product, or variants of the device with additional optical functionality depending on user requirements. e.g. integrated time delays, additional SOAs and optical feedback paths can be included in the module. The module can also be designed to operate at different wavelength bands over 1100nm to 1650nm.

Operation
Measured eye diagram at 40Gb/s showing operation of the 2R regenerator as a wavelength converter. Device was operating in push-pull mode with co-propagating clock and data with a 15ps switching window. Average switching powers at 40Gb/s were 1.5dBm
**Absolute maximum ratings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>SOA bias current (per SOA)</td>
<td>400</td>
<td>mA</td>
</tr>
<tr>
<td>Average switching data power</td>
<td>+13</td>
<td>dBm</td>
</tr>
<tr>
<td>Average CW wavelength power</td>
<td>+13</td>
<td>dBm</td>
</tr>
<tr>
<td>Peltier Current</td>
<td>2.5</td>
<td>A</td>
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<tr>
<td>Operating Temperature</td>
<td>30</td>
<td>°C</td>
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</tbody>
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**Ordering Information—Part Number 40G-2R-ORP**

For custom products please contact CIP Sales on +44 1473 663210 or e-mail sales@ciphotonics.com.
For details of your local agent, visit www.ciphotonics.com

**Pin out and Dimensions**

Input fibres x4

Output fibres x2

Fibre breakout and FC/APC connectors provided

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