



Centre for Integrated Photonics

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Non-linear semiconductor optical amplifier offers versatile platform for all-optical 40Gb/s network development

** tuned characteristics support wavelength conversion, 2R regeneration, Boolean logic*

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The Centre for Integrated Photonics (CIP) has launched a novel semiconductor optical amplifier (SOA) offering optimised non-linear operating characteristics that may be used to implement advanced all-optical networking functions such as wavelength conversion. The new component, SOA-NL-OEC-1550, has an extremely fast gain recovery that makes it ideal for use at 40Gb/s transmission speeds, and additionally offers large-spot interfaces with ultra-low reflectivity that allow it to be passively aligned when building integrated optical sub-systems.

Designed by a team with a background in telecommunications component and sub-system development, the SOA is highly optimised for next-generation WDM (wavelength division multiplexing) applications, and has already been used successfully for wavelength conversion and 2R (reamplifying and reshaping) signal regeneration at 40Gb/s.

Among the optimised operating parameters offered by the 1550nm indium-phosphide, multiple quantum well SOA device are a saturated gain recovery time ($1/e$) of less than 25 picoseconds - which supports 40Gb/s transmission speeds - and a polarisation dependent saturated gain of less than 0.5dB. The device also offers a high gain figure of over 30dB for small signal inputs. To optimise performance in its target applications the device features an internal active waveguide with a high confinement factor of over 20%.

These tuned characteristics allow the SOA to perform well in a range of advanced optical applications. The device can be controlled to exploit four-wave mixing, cross-gain modulation or cross-phase modulation effects to implement all-optical wavelength conversion - providing a dynamic mesh connectivity capability to dramatically enhance the flexibility of point-to-point optical networks. The phase change characteristics of the non-linear SOA - and its high gain - may also be employed to regenerate optical signals. The device is also ideal for implementing all-optical Boolean logic functions.

"Investment in backbone network infrastructure is coming to the fore again, and this device with its novel 40Gb/s performance offers a versatile platform for new developments", says Neil Weston, CIP's VP of Sales & Marketing. "To support this market we are backing the component with comprehensive engineering and production services. CIP is able to optimise the performance characteristics of the device, or add extra functions - either by monolithic or hybrid integration techniques".

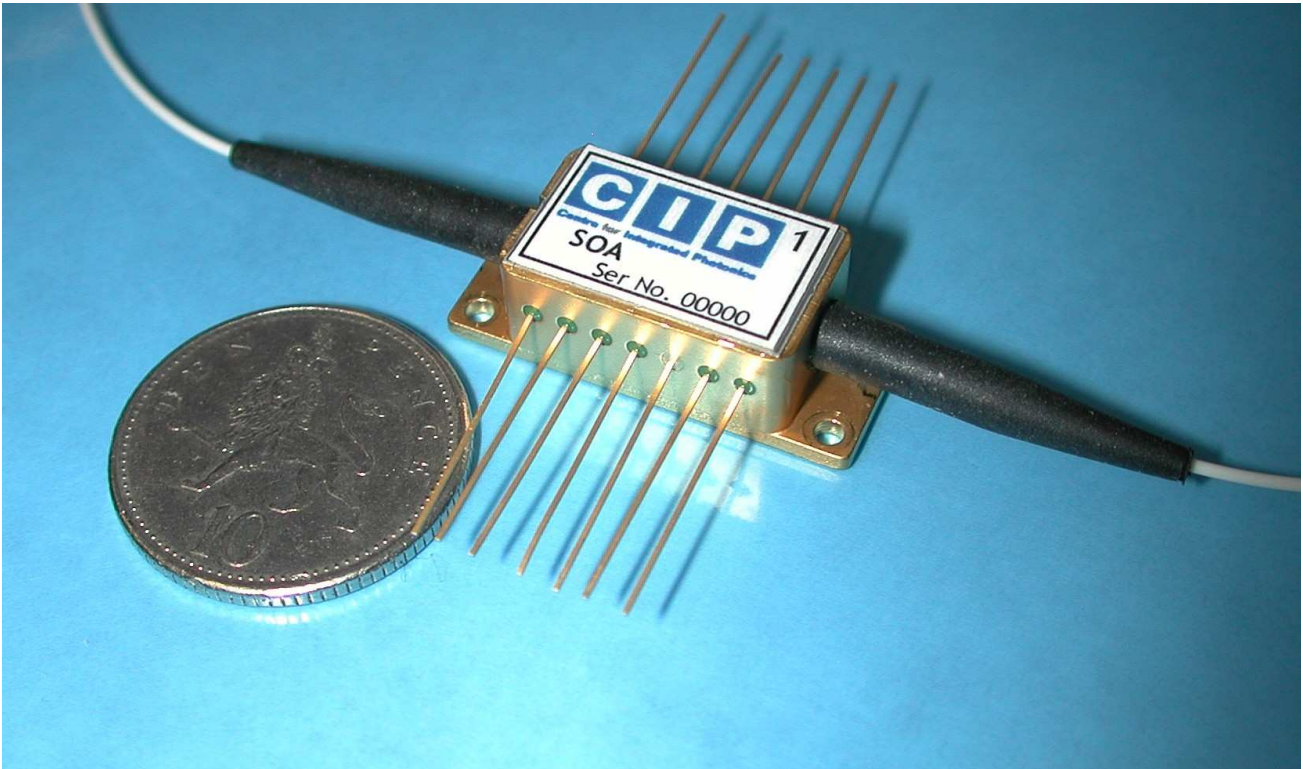
The new SOA joins a comprehensive range of compound-semiconductor device functions for optical networking developed over many years by CIP. CIP has a long pedigree in optoelectronics, having previously been part of Corning, and before that British Telecom's Photonic Technology Research Centre. The organisation has its own semiconductor fabrication plant and is able to create variants of the SOA with application-specific performance requirements such as custom

device lengths, additional active optical processing functions, or as an integrated array of devices. CIP's world-leading capabilities in hybrid integration also allow the SOA to be offered packaged with customer-specified planar silica waveguide optoelectronic elements such as interferometers; CIP already makes a hybrid variant of the device with a Mach-Zehnder interferometer.

The new LS-SOA is supplied in a butterfly package for use with an external temperature controller, and is available for immediate delivery in small quantities.

A datasheet is available on request from info@ciphotonics.com

Image & text available at: www.wordsun.com/cip2.html or www.ciphotonics.com/cip_press.htm



The Centre for Integrated Photonics Ltd (CIP) is an R&D facility specialising in integration technologies for microsystems and nanotechnologies, with a key competence in photonic integration. The company has been set up to carry out contract research and development in photonic integration, using the underpinning technologies of III-V photonic materials, silicon micromachining, and planar silica. CIP's extensive facilities and capability include design, fabrication, analysis, packaging and system testing to support world-leading device innovations. The centre's staff are highly experienced in commercial R&D (>500 man years for core technical staff) and internationally recognised in their technical areas. The Centre is set up as a development and small scale production laboratory to offer services to both industry and academia, and act as a bridge between them, allowing industry access to new ideas from academia, and academia access to downstream routes to industry.

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