



purpose photonic, electrical and optoelectronic device models, together with advanced circuit optimization and yield analysis capabilities. The VPItoolkit PDK LIGENTEC library extension adds foundry-certified simulation compact models for the standard building blocks supported by the AN800 process and enables a layout-aware schematic-driven PIC design workflow, including chip layout optimization according to the device's required optical functionality.

Importantly, it also allows designers to construct their own hierarchical and custom building blocks, effectively expanding the foundry PDK to fit individual needs. The layout for photonic integrated circuits designed through the process can be automatically exported to IPKISS by Luceda.

Customers gain access to LIGENTEC's mature silicon nitride photonics fabrication line, specially developed modules and optimized building blocks for design implementation. LIGENTEC allows its customers to share space on the reticle, which keeps costs down.

To employ the benefit of large transparency window of SiN, the company suggests processes adapted for near-/mid-IR and for visible wavelength range; applications targeting these wavelengths tend to benefit most from SiN technology including everything from quantum communications and LiDAR to bio-sensing and microscopy.

MA: How is LIGENTEC positioning itself to grow into its next stage of development as the movement to replace electrons with photons gathers momentum?

MG: LIGENTEC recently announced the appointment of an experienced photonics & sensors executive, Dr. Thomas Hessler, as a new member of the company's Board of Directors.

Thomas is a very valuable addition to our company in several aspects: He brings not only his knowledge of the Swiss ecosystem and his worldwide connections to key market players, but also understands the technology and its potential to open new market areas that still have to be developed.

His leadership skills and insights are to be put to good use to support the next stage of growth for LIGENTEC. Thomas takes what is considered a holistic approach to achieving success. His hands-on knowledge, built over years of experience growing a company, along with an extensive network of professionals and decision makers, is a great asset. Access to his knowledge and network will help position LIGENTEC for success.

Hessler brings over 20 years executive management experience in high-tech B2B with a focus on photonic and sensor devices. His former company, Axetris AG,

Figure 1: LIGENTEC brings your ideas to reality. Whether you are exploring new areas for your business or looking for fast prototyping at shared cost, LIGENTEC proposes their Multi Project Wafer (MPW) programme as a solution.



Thomas Hessler

MPW number	SiN thickness	Registration deadline	Tape-in	Expected die delivery
LGT-MPW-VIS-02	150nm	29/03/19	12/04/19	12/07/19
LGT-MPW-IR-09	800nm	31/05/19	14/06/19	13/09/19
LGT-MPW-VIS-03	150nm	26/07/19	09/08/19	08/11/19
LGT-MPW-IR-10	800nm	06/09/19	20/09/19	03/01/20

Table 1:
LIGENTEC's
next multi-
project wafer
(MPW) dates

became a market leader for micro-optics, optical gas sensing components and specialty MEMS foundry services with applications in automotive, medical, analytical and industrial spaces.

At the time of his board appointment, Hessler remarked, "LIGENTEC's groundbreaking all-nitride-core technology combines low propagation loss with small device structures; it offers the best of both worlds compared to conventional photonic integration technologies. Its ability to be integrated easily with fibers and active functionalities will be key to achieve success in many PIC applications such as datacom, space, LiDAR and sensing. I'm excited to join the great entrepreneurial team at LIGENTEC."

MA: One of the greatest challenges facing the PIC industry is test, assembly and packaging (TAP) solutions; fiber-to-chip coupling is often considered a 'bottleneck.' Does LIGENTEC have a solution to help remedy this issue?

MG: Even though PICs become more and more sophisticated and functional, there is still an issue of non-efficient input-output interfaces, which introduce quite significant coupling-related losses. Even though academic researchers and industry insiders are pushing the limits of integrated photonics technology to improve propagation losses by hundredth of dB/cm

on a chip, we are still seeing losses of up to several dB per facet! This fact greatly limits the integration of PIC technology into the existing ecosystem of optical and optoelectronic systems.

Today, the most efficient ways of communication for PICs with the "outside world" require UHNA or lensed fibers, which are non-standard (compared to the more commonly used fibers seen in today's optical systems); they are expensive and hard-to-handle. Moreover, they are very sensitive to alignment due to the small mode field diameter. Altogether, this leads to expensive and complicated packing (or system integration) procedures, hardly compatible with the high volume requirements of telecom and datacom applications.

To overcome this obstacle, LIGENTEC developed and patented a brand new "X-Spot" module - an optical I/O interface with large mode field diameter matching that of the SMF-28 fiber. It allows unprecedented coupling efficiency (<1dB) for thick film PICs with industry standard optical fibers and significantly decreases the price and efforts for packaging procedures.

"Having a mature, ultra-low-loss platform with highly efficient fiber-to-PIC communication brings us one step closer to achieving the bright future of integrated photonics," Geiselmann concluded.

Figure 2:
LIGENTEC
developed and
patented its new
"X-Spot" module
- an optical I/O
interface with a
large mode field
diameter that
matches SMF-
28 fiber; this
advancement
can dramatically
reduce coupling-
related signal
losses.

