



## Tower Semiconductor and Quintessent Announce Partnership to Create Foundry Silicon Photonics Platform with Integrated Quantum Dot Laser

September 2, 2021

***New capability to address optical connectivity in Artificial Intelligence/Machine Learning (AI/ML) and disaggregated computing (datacenter)***

**MIGDAL HAEMEK, Israel, and SANTA BARBARA, Calif – Sept. 2, 2021** – Tower Semiconductor (NASDAQ/TASE: TSEM), the leading foundry of high value analog semiconductor solutions, and Quintessent, a leader in laser integration with silicon photonic integrated circuits, today announced their collaboration to create the world's first Silicon Photonics (SiPho) process with integrated quantum dot lasers, addressing optical connectivity in Artificial Intelligence/ Machine Learning and disaggregated computing (datacenter) markets. According to the market research firm Yole, the silicon photonics transceivers market for datacenters is expected grow rapidly at a CAGR of 40% to reach \$3.5B in 2025.

The new foundry process will build upon Tower's industry leading PH18 production [silicon photonics platform](#) and add Quintessent's III-V quantum dot-based lasers and optical amplifiers to enable a complete suite of active and passive silicon photonic elements. The resulting capability will be an industry first in demonstrating integrated optical gain in a standard foundry silicon photonics process. The initial process development kit (PDK) is planned in 2021, with multi-project wafer runs (MPWs) following in 2022.

"Quintessent and Tower are re-defining the frontiers of integrated silicon photonics under this effort," said Dr. John Bowers, UCSB Professor and QuintessentCo-Founder. "I'm very excited by the prospects for a new class of high-performance lasers and photonic integrated circuits on silicon, leveraging the unique advantages of quantum dot materials."

The co-integration of lasers and amplifiers with silicon photonics at the circuit element level will improve overall power efficiency, eliminate traditional design constraints such as on-chip loss budgets, simplify packaging, and make possible new product architectures and functionalities. For example, a silicon photonic transceiver or sensor product with integrated lasers will be capable of complete self-test at the chip or wafer level. These advantages are further enhanced by employing semiconductor quantum-dots as the active optical gain media, which enables devices with greater reliability, lower noise, and the ability to operate efficiently at higher temperatures.

"Bringing the III-V laser diode within our silicon photonics platform will enable single chip photonic integrated circuit (PIC) design. This means that both III-V quantum dot amplifiers and lasers, and Tower's silicon photonics passive and active elements, will be delivered by a foundry through a single MPW chip run," said Dr. David Howard, Tower Semiconductor Executive Director and Fellow.

"We are pleased to combine our quantum dot gain functionality with Tower's proven silicon photonics process to enable a disruptive new capability. This platform has great potential to solve the connectivity bottleneck limiting AI training systems and disaggregated computing, among other applications," said Dr. Alan Liu, co-founder and CEO of Quintessent.

The augmented PH18 process is part of DARPA's Lasers for Universal Microscale Optical Systems (LUMOS) program, which aims to bring high-performance lasers to advanced photonics platforms, addressing commercial and defense applications.

For further information about Tower Semiconductor's Silicon Photonics platform, please visit [here](#).

*Distribution Statement A - Approved for Public Release, Distribution Unlimited.*

### **About Quintessent**

Quintessent is a leader in laser integration with silicon photonic integrated circuits. Quintessent is developing disruptive connectivity solutions to unlock new scale-out pathways for AI/ML systems through innovations in silicon photonics and quantum dot lasers and amplifiers. Quintessent is a privately held company located in Santa Barbara, CA, and is a founding member of the CW-WDM MSA which seeks to standardize WDM multi-wavelength light sources for emerging high-density co-packaged optics, optical computing, and AI. To learn more about Quintessent, please visit [www.quintessent.com](http://www.quintessent.com) or contact [info@quintessent.com](mailto:info@quintessent.com)

### **About Tower Semiconductor**

Tower Semiconductor Ltd. (NASDAQ: TSEM, TASE: TSEM), the leading foundry of high value analog semiconductor solutions, provides technology and manufacturing platforms for integrated circuits (ICs) in growing markets such as consumer, industrial, automotive, mobile, infrastructure, medical and aerospace and defense. Tower Semiconductor focuses on creating positive and sustainable impact on the world through long term partnerships and its advanced and innovative analog technology offering, comprised of a broad range of customizable process platforms such as SiGe, BiCMOS, mixed-signal/CMOS, RF CMOS, CMOS image sensor, non-imaging sensors, integrated power management (BCD and 700V), and MEMS. Tower Semiconductor also provides world-class design enablement for a quick and accurate design cycle as well as Transfer Optimization and development Process Services (TOPS) to IDMs and fabless companies. To provide multi-fab sourcing and extended capacity for its customers, Tower Semiconductor operates two manufacturing facilities in Israel (150mm and 200mm), two in the U.S. (200mm), one in Italy (300mm), and three facilities in Japan (two 200mm and one 300mm) through TPSCo. For more information, please visit: [www.towersemi.com](http://www.towersemi.com).

### **Safe Harbor Regarding Forward-Looking Statements**

This press release includes forward-looking statements, which are subject to risks and uncertainties. Actual results may vary from those projected or implied by such forward-looking statements. A complete discussion of risks and uncertainties that may affect the accuracy of forward-looking statements included in this press release or which may otherwise affect Tower's business is included under the heading "Risk Factors" in Tower's most recent filings on Forms 20-F, F-3, F-4 and 6-K, as were filed with the Securities and Exchange Commission (the "SEC") and the Israel Securities

Authority. Tower does not intend to update, and expressly disclaim any obligation to update, the information contained in this release.

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