UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 6-K

REPORT OF FOREIGN PRIVATE ISSUER PURSUANT TO RULE 13a-16 OR 15d-16
OF THE SECURITIES EXCHANGE ACT OF 1934

For the month of November 2026 No.2

Commission File Number 0-24790

TOWER SEMICONDUCTOR LTD.

(Translation of registrant's name into English)

Ramat Gavriel Industrial Park
P.O. Box 619, Migdal Haemek, Israel 2310502
(Address of principal executive offices)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.

Form 20-F ☒ Form 40-F ☐

On November 3, 2026, the Registrant and Innolight Announce Advancing High-Performance Near-Package Optics for AI Infrastructure

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

TOWER SEMICONDUCTOR LTD.

Date: November 3, 2026

By: /s/ Nati Somekh
Name: Nati Somekh
Title: Corporate Secretary

Tower Semiconductor and Innolight Advance High-Performance Near-Package Optics for AI Infrastructure

Leveraging Tower's 200mm and 300mm Silicon Photonics platforms, the collaboration supports multiple generations of Near-Packaged Optics development for AI infrastructure

MIGDAL HAEMEK, Israel and SUZHOU, China, November 3, 2026 – Tower Semiconductor (NASDAQ/TASE: TSEM), the leading foundry for high-value analog semiconductor solutions, and Innolight, a leading provider of optical connectivity solutions for data center and AI infrastructure applications, today announced their continued collaboration on emerging Near-Package Optics (NPO) applications. The collaboration combines Innolight's expertise in optical interconnect solutions with Tower's high-volume 200mm and 300mm Silicon Photonics manufacturing platforms to address the increasing performance and bandwidth requirements of next-generation AI infrastructure.

Leveraging Tower's high-volume 200mm and 300mm Silicon Photonics platforms, Innolight has achieved a key milestone in the development of its Near-Package Optics (NPO) portfolio with its first NPO device entering early production using Tower's PH18M Silicon Photonics process flow running in Tower's US CA factory. In parallel, Innolight has taped-out multiple NPO products on Tower's 300mm Silicon Photonics platform to support future product generations.

As AI workloads continue to scale, NPO architectures are emerging as one of the preferred approaches for next-generation optical interconnects. These emerging architectures are expected to drive additional demand beyond today's pluggable optical module market, driving the new phase of optical interconnect solutions for AI and cloud infrastructure.

"Near-Package Optics is emerging as a key technology for next-generation AI and cloud infrastructure," said Oliver Sun, CTO of Innolight**.** "Our collaboration with Tower provides us with industry leading capabilities enabling us to accelerate the development of NPO solutions to meet the evolving needs of hyperscale and AI data center customers."

NPO architectures typically require substantially higher optical channel counts than conventional pluggable optical modules, often integrating 16 or more channels on a single device. As channel counts increase, manufacturing expertise, process control, and yield performance become increasingly critical. Tower's leadership in high-volume Silicon Photonics manufacturing and its advanced 200mm and 300mm SiPho platforms provide the process uniformity, high-yield performance, and rich device offerings needed to support these increasingly complex designs. The platform also enables monolithic integration of multiple photonic functions, including wavelength division multiplexing and demultiplexing on a single chip, enabling increased functionality with compact size while optimizing performance and scalability.

"Given their market and product leadership, Innolight continues to be a critical technology partner for Tower's silicon photonics roadmap as well as cornerstone manufacturing customer now across four of our facilities, two in the US (Newport Beach California and San Antonio Texas) and one each in Israel and Japan," said Dr. Marco Racanelli, President, Tower Semiconductor. "By combining Innolight's innovation in optical connectivity with Tower's differentiated Silicon Photonics technologies and manufacturing expertise, we continue to advance solutions that address the demands of future optical networks."

For additional information about Tower Semiconductor's SiPho platform, visit here.
For additional information about Innolight, please visit here.

About Innolight
InnoLight is a world leader in providing a wide range of high-speed optical solutions for optical communication networking, especially for AI and Data Center applications, with global footprints in California, Singapore, Thailand, and Taiwan and Suzhou China. For more information, please visit www.innolight.com.

About Tower Semiconductor
Tower Semiconductor Ltd. (NASDAQ/TASE: TSEM) is a leading foundry of high-value analog semiconductor solutions, serving growing markets including industrial, automotive, mobile, infrastructure, medical, and aerospace & defense. The company offers a broad portfolio of advanced and innovative analog technologies, including silicon photonics (SiPho), SiGe, RF CMOS, CMOS image sensors, power management, and mixed-signal, supported by world-class design enablement and process transfer services. Tower operates a global manufacturing network with 200mm and 300mm fabs in Israel, the U.S., Japan, and Italy, providing customers with scalable capacity and multi-fab sourcing. Learn more at: 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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