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 August 2025 No.3

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 August 12, 2025, the Registrant and AIStorm Introduced Cheetah HS,
World's First Up-to-260K FPS AI-in-Imager Chip for Inspection, Robotics & Sports

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: August 12, 2025

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

AIStorm & Tower Semiconductor Introduce Cheetah HS, World's First Up-to-260K FPS AI-in-Imager Chip for Inspection, Robotics & Sports

Charge-domain imager with on-chip neural network, provides breakthrough slow-motion vision at a fraction of the cost and power consumption of competing high-speed cameras

HOUSTON, Texas, and MIGDAL HAEMEK, Israel - August 12, 2025: AIStorm, the market leader in charge-domain solutions for edge AI, and Tower Semiconductor (NASDAQ/TASE: TSEM), a leading foundry of high-value analog semiconductor solutions, today announced the availability of the Cheetah HS — a high-speed, 120×80-pixel imager with first-layer AI capability that captures up to 260,000 frames per second — 2,000 to 4,000 times faster than conventional CMOS sensors. The Cheetah HS architecture is made possible by Tower's unique charge-domain imaging platform which is leveraged by AIStorm's proprietary charge-domain-based analog AI neurons.

By combining ultra-high-speed imaging with charge-domain AI, Cheetah HS slashes system power requirements and bill-of-materials cost for designers of robotics, drones, vibration- and structure-health monitors, high-speed security and surveillance tracking systems, manufacturing and assembly lines, barcode readers, PCB-inspection equipment, biometric unlock systems, vehicle-speed detectors, and even golf-swing analyzers.

"Many consumer and industrial applications require ultra-slow-motion analysis of real-time events to analyze performance or detect anomalies. Such solutions are very costly, and our Cheetah HS solution makes them affordable for a wide range of markets and end applications," said **David Schie, CEO of AIStorm.** "Tower is a global leader in charge-domain global-shutter pixels, making them the ideal partner for the development and production of such groundbreaking products."

"We are very pleased to see the fruits of our long term, close collaboration with AIStorm on this unique breakthrough platform of analog charge-domain embedded AI technology," said **Dr. Avi Strum, SVP and GM of the Sensors and Displays BU at Tower Semiconductor**. "Its inherent low-power, low-cost, and high-performance virtues will enable a family of affordable, high-volume products in the near future."

Key advantages of Cheetah HS

- Adjustable frame rate up to 260,000 frames per second (fps)
- Integrated LED driver (programmable up to 40 mA)
- Enhanced low light performance
- Integrated charge-domain neuron layer outputting pulse streams for downstream neural-network layers or raw high-speed video
- Dramatic cost advantage over competitors
- Lowers processing costs by capturing images quickly, leaving more time per frame for processing
- Ability to capture extremely high-speed events and analyze them in slow motion

How it works

Traditional high-speed cameras utilize expensive high-speed data converters to capture data, which separates the AI input layer from the pixels, increasing the BOM cost and necessitating high-speed connectors and interface components. Cheetah HS's charge-domain architecture converts incoming photons to charge, computes the first neural-network layer in analog form, then outputs a pulse train that can be processed by downstream networks. The capture rate is programmable, allowing lower frame rates with faster capture times (reducing the cost of processing) or faster frame rates for accurate measurements or slow-motion analysis.

Availability

Cheetah HS is available now in both chip form as well as full reference-camera systems [aistorm.ai/cheetah].

About AIStorm

AIStorm is the leader in AI-in-sensor edge solutions for imaging, audio and biometrics. The company pioneered charge-domain processing — with more than 40 patents worldwide — which overcomes latency, optimizes power and minimizes the cost of inference and learning at the edge. AIStorm offers always-on sentry AI-in-sensor imaging solutions, high-speed imaging solutions, smart always-on solutions for audio applications, and human interface & biometric solutions. To learn more, visit aistorm.ai.

Press contact

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About Tower Semiconductor

Tower Semiconductor Ltd. (NASDAQ/TASE: TSEM), the leading foundry of high-value analog semiconductor solutions, provides technology, development, and process platforms for its customers in growing markets such as consumer, industrial, automotive, mobile, infrastructure, medical and aerospace and defense. Tower Semiconductor focuses on creating a 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, displays, integrated power management (BCD and 700V), photonics, and MEMS. Tower Semiconductor also provides world-class design enablement for a quick and accurate design cycle as well as process transfer services including development, transfer, and optimization, to IDMs and fabless companies. To provide multi-fab sourcing and extended capacity for its customers, Tower Semiconductor owns one operating facility in Israel (200mm), two in the U.S. (200mm), two in Japan (200mm and 300mm) which it owns through its 51% holdings in TPSCo, shares a 300mm facility in Agrate, Italy with STMicroelectronics as well as has access to a 300mm capacity corridor in Intel's New Mexico factory. For more information, please visit: 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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