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**FORM 6-K**

**SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

For the month of October 2010 No. 1

**TOWER SEMICONDUCTOR LTD.**

(Translation of registrant's name into English)

**Ramat Gavriel Industrial Park**  
**P.O. Box 619, Migdal Haemek, Israel 23105**  
(Address of principal executive offices)

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

Form 20-F  x

Form 40-F  o

Indicate by check mark whether the registrant by furnishing the information contained in this Form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.

Yes  o

No  x

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On October 07, 2010 the registrant announces Ensphere Leverages TowerJazz's 0.18-micron SiGe BiCMOS Process to Achieve Fully Integrated One Chip Optical Transceiver IC.

This Form 6-K is being incorporated by reference into all effective registration statements filed by us under the Securities Act of 1933.

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**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: October 07, 2010

By: /s/ Nati Somekh Gilboa

Name: Nati Somekh Gilboa

Title: Corporate Secretary

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## **Ensphere Leverages TowerJazz's 0.18-micron SiGe BiCMOS Process to Achieve Fully Integrated One Chip Optical Transceiver IC**

*ESI-1002 enables SFP+ modules with sub-1 watt power consumption*

*Overall SFP+ module shipment per year expected to be \$2.5B; total revenue for chipmakers approximately \$300M per year*

**NEWPORT BEACH and SANTA CLARA, Calif., October 07, 2010** – [TowerJazz](#), the global specialty foundry leader, today announced that [Ensphere Solutions](#) has chosen the foundry's 0.18-micron [SiGe BiCMOS](#) process (SBC18) for its fully integrated one chip optical transceiver IC (ESI-1002) targeting 10G data communication and storage area network applications. Now shipping in volume, the ESI-1002 supports rates from 1G to 12G and enables SFP+ modules to be designed with sub-1watt power consumption. Ensphere is leveraging the 0.18-micron SiGe offering that includes 177 GHz Fmax, a 0.18um CMOS transistor, and high density stacked 4.0uf/mm2 MIM cap. This process was chosen for its optimization for optical networking and storage solutions as well as wireless, wireline and tuner applications.

Ensphere Solutions' ESI-1002 is an [optical transceiver](#) IC that, together with a TOSA, ROSA and a simple external microcontroller, form a complete SFP+ module. It includes all the functionality for transmit laser control and supports both EDC and LIA modes on the receive side. The ESI-1002 can be used as a VCSEL driver directly. Its unique architecture for the laser driver allows for the lowest power consumption and uses a single 2.5V power supply. The ESI-1002's sub-1W power consumption and excellent EMI performance allow for system design with high port density.

"We continue to utilize TowerJazz as our foundry partner for their excellent support, easy access to their team and frequent shuttle runs during the manufacturing process," said Hessam Mohajeri, Ensphere's CEO. "For our ESI-1002 product, we required a specialty technology that allowed our transceiver to have very dense control circuitry which is not available in other processes. In addition, TowerJazz provided us with a high degree of reliability as the models and performance of the transistors matched the actual silicon."

"Customers like Ensphere use our high performance 0.18-micron specialty silicon process technologies to achieve rapid time-to-market for high speed networking applications," said Marco Racanelli, Senior VP and GM, RF and High Performance Analog Business Group, TowerJazz. "We look forward to maintaining our relationship with Ensphere in the future to provide a range of technology, features and consistent design environment to enable a competitive advantage for the design and manufacturing of their leading edge, differentiated networking ICs."

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**About Ensphere Solutions, Inc.**

Ensphere Solutions Inc., a privately held company, offers advanced communications semiconductor ICs, IP cores and professional design services. Based in Silicon Valley, CA, the company specializes in the development of standard and custom mixed signal transceivers and RF chips. The company's standard products are targeted for high-speed optical data communications. For more information visit: [www.enspheresolutions.com](http://www.enspheresolutions.com).

**About TowerJazz**

Tower Semiconductor Ltd. (NASDAQ: [TSEM](#), TASE: TSEM), the global specialty foundry leader and its fully owned U.S. subsidiary Jazz Semiconductor, operate collectively under the brand name TowerJazz, manufacturing integrated circuits with geometries ranging from 1.0 to 0.13-micron. TowerJazz provides industry leading design enablement tools to allow complex designs to be achieved quickly and more accurately and offers a broad range of customizable process technologies including SiGe, BiCMOS, Mixed-Signal and RFCMOS, CMOS Image Sensor, Power Management (BCD), and Non-Volatile Memory (NVM) as well as MEMS capabilities. To provide world-class customer service, TowerJazz maintains two manufacturing facilities in Israel and one in the U.S. with additional capacity available in China through manufacturing partnerships. For more information, please visit [www.towerjazz.com](http://www.towerjazz.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 and/or Jazz'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 and Jazz's most recent filings on Forms 10-K and 10-Q, as were filed with the SEC, respectively. Tower and Jazz do not intend to update, and expressly disclaim any obligation to update, the information contained in this release.

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