
FORM 6-K

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

For the month of February 2010 No. 2

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 S

Form 40-F £

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 £

No S

On February 02, 2010, the registrant announces that TowerJazz and Soitec Sign Agreement to Offer Backside Illumination Platform for High-End Image Sensors.

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

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: February 02, 2010

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

TowerJazz and Soitec Sign Agreement to Offer Backside Illumination Platform for High-End Image Sensors

Collaboration enables rapid ramp to turnkey solution for fabless CIS designers targeting industrial, medical and automotive applications

High-end BSI image sensor market to reach \$120M by 2013

MIGDAL HAEMEK, Israel and BERNIN, France, February 2, 2010 —TowerJazz, the global specialty foundry leader and The Soitec Group (Euronext Paris), the world's leading supplier of silicon-on-insulator (SOI) and other engineered substrates for the microelectronics industry, announced today that they have signed an agreement that will enable a turn-key solution for high-end backside illuminated (BSI) CMOS image sensors (CIS) for industrial, medical and automotive applications.

“The market for BSI CMOS image sensors replacing current Front Side Illumination (FSI) technology is expected to reach \$800M in 2013,” according to Jerome Baron, principal analyst at Yole Developpement. “The BSI image sensor market will be mainly driven by digital cameras and cell-phone applications, but high performance imaging applications such as medical, industrial and automotive vision sensors are also an important segment. We estimate the market for high-end BSI image sensors to reach \$120M in the same time frame.”

The TowerJazz BSI CIS offering will leverage the foundry's extensive expertise and leadership in CIS technology and will integrate SOI substrates and Soitec's new Smart Stacking™ circuit layer transfer technology, customized for the TowerJazz fabrication process. Soitec is the market leader in SOI wafers and circuit stacking solutions and TowerJazz is well-known for its industry leading pixel performance. This collaboration will enable a rapid ramp to a complete BSI foundry solution that can be transparently utilized by TowerJazz customers.

Backside illumination is fast gaining traction in the image sensor market for its higher resolution, smaller pixels that capture far more light, higher quantum efficiency (QE), and improved performance. BSI allows 100% fill factor of pixels maximizing photon collection without any shading of metals. This provides very high light sensitivity in high-end applications.

SOI substrates, which Soitec manufactures using its patented Smart Cut™ process, make BSI much more robust to manufacture in high volume. Soitec's new Smart Stacking technology enables chip manufacturers to leverage wafer-to-wafer level stacking through low-stress bonding and high-precision thinning of partially or fully processed circuits. It is particularly well suited to achieving low cross-talk and better pixel quality in BSI CMOS image sensors through access to the backside of the device.

"This is a unique offering in the foundry area and we will be the first to offer such technology to customers as a foundry service. Soitec's SOI substrates and Smart Stacking circuit transfer technology are an excellent complement to our industry-leading CIS technology," said Dr. Avi Strum, Vice President and General Manager, TowerJazz Specialty Business Unit. "Our collaboration will result in high-performance image sensors and will allow fabless designers to create new generations of ultra-sensitive image sensors – which in turn will enable exciting new applications for cinematography, DSLR cameras, space cameras, and high-end medical cameras, among others."

"This partnership will be a great advantage for the fabless design community," said Dr. Bernard Aspar, Vice President and Managing Director of Soitec's Tracit Business Unit, which developed the Smart Stacking technology. "We believe TowerJazz's excellent CIS technology, combined with our best-in-class SOI substrates and unique Smart Stacking manufacturing capabilities, will provide a comprehensive BSI offering, enabling a turnkey solution for their CIS customers."

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.

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.

About the Soitec Group

The Soitec Group is the world's leading innovator and provider of the engineered substrate solutions that serve as the foundation for today's most advanced microelectronic products. The group leverages its proprietary Smart Cut™ technology to engineer new substrate solutions, such as silicon-on-insulator (SOI) wafers, which became the first high-volume application for this proprietary technology. Since then, SOI has emerged as the material platform of the future, enabling the production of higher performing, faster chips that consume less power. Today, Soitec produces more than 80 percent of the world's SOI wafers. Headquartered in Bernin, France, with two high-volume fabs on-site, Soitec has offices throughout the United States, Japan and Taiwan, and a new production site in Singapore.

Three other divisions, Picogiga International, Tracit Technologies and Concentrix Solar, complete the Soitec Group. Picogiga delivers advanced substrate solutions, including III-V epiwafers and gallium nitride (GaN) wafers, to the compound material world for the manufacture of high-frequency electronics and other optoelectronic devices. Tracit, on the other hand, provides thin-film layer transfer technologies used to manufacture advanced substrates for power ICs and Microsystems, as well as generic circuit transfer technology, Smart Stacking for applications such as image sensors and 3D-integration. In December 2009, Soitec acquired 80% of Concentrix Solar, the leading provider of concentrated photovoltaic (CPV) solar systems for the industrial production of energy. With this acquisition, Soitec is entering the fast-growing solar industry; capturing value through the system level. Shares of the Soitec Group are listed on Euronext Paris. For more information, visit www.soitec.com.

Soitec, Smart Cut, Smart Stacking and UNIBOND are trademarks of S.O.I.TEC Silicon On Insulator Technologies.

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