

FORM 6-K

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

For the month of October 2009 No. 6

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 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

On October 20, 2009, the registrant announces CMOSIS Ramps First Off-the-Shelf High Resolution Sensor using Tower Semiconductor's Specialty 0.18-micron CMOS Image Sensor Technology.

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: October 20, 2009

By: /s/ Nati Somekh Gilboa

Nati Somekh Gilboa
Corporate Secretary

CMOSIS Ramps First Off-the-Shelf High Resolution Sensor using Tower Semiconductor's Specialty 0.18-micron CMOS Image Sensor Technology

2.2 Megapixel CMV2000 is targeted at demanding machine vision sensor market, estimated at ~\$200M

ANTWERP, Belgium and MIGDAL HA'EMEK, Israel, October 20, 2009 – CMOSIS, an independent developer and supplier of high end CMOS image sensors for professional imaging applications, and Tower Semiconductor, Ltd. (Nasdaq: TSEM, TASE: TSEM), the leading global specialty foundry, today announced CMOSIS has ramped its first off-the-shelf high resolution sensor (CMV2000) using Tower's advanced 0.18-micron CMOS image sensor (CIS) technology. This highly integrated image sensor targets machine vision applications and enables global shutter (snapshot) operation and fast on-chip analog to digital conversion (ADC) to meet this market's demanding requirements for leading-edge performance, advanced features, and reduced die size and price.

CMOSIS estimates the machine vision sensor market at ~\$200M (CCD and CMOS combined). Tower and CMOSIS are well-positioned to win a significant share of future industrial and professional CMOS image sensor markets as next-generation CMV2000 sensors could also be used for automotive and security applications.

"We chose Tower based on its advanced CMOS technology and process flexibility which allowed us to explore more options leading to stronger and more reliable performance. With other foundries, you have to stay within smaller technical boundaries," said Luc De Mey, CMOSIS CEO. "In addition, we found easy accessibility to Tower's excellent R&D support and we value the long term process availability that Tower offers."

"CMOSIS, its key personnel, and its IP are well known in the industry. Combined with our expertise in CMOS image sensors, we are able to provide them an edge in the market," said Dr. Avi Strum, Vice President and General Manager of Tower's Specialty Business Unit. "Our dominant position especially in Europe, Korea and the U.S. has been proven by our many customer engagements and CMOSIS now joins the 'club' of leading edge companies who have chosen Tower for our specialty process superiority over every other foundry."

CMOSIS also selected Tower's advanced 0.18-micron process for its aggressive layout rules, allowing a novel pixel structure featuring a pixel size of 5.5µm x 5.5µm which is needed to stay close to a 2/3" optical format with 2.2M pixel resolution and form factor. The CMV2000 combines a pipelined global shutter operation that allows true correlated double sampling and a full-frame rate of 300 fps and yields an unprecedented low noise level below 18 electrons and 16-channel LVDS interfacing. The CMV2000 integrates a high performance 10bit column ADC on-chip which features a slow 12bit mode and multiple HDR modes, all housed in a very compact 95pin ceramic PGA package.

Availability

Samples of the CMV2000 are currently released to specified CMOSIS customers. Full production will ramp in early 2010. A 4 Megapixel version of the new sensor, named CMV4000, will be available to camera manufacturers beginning May 2010.

About CMOSIS

CMOSIS is a pure-play supplier of standard off-the-shelf and application-specific CMOS image sensors for the industrial and professional market covering applications such as machine vision, scientific, medical, automatic data capture and space. CMOSIS was conceived as a fabless CMOS image sensor vendor providing in-house design, characterization and qualification facilities for research, development and volume production. CMOSIS currently employs 15 people and is headquartered in Antwerp, Belgium (www.cmosis.com).

About Tower Semiconductor, Ltd. and Jazz Semiconductor, Inc.

Tower Semiconductor Ltd. (NASDAQ: TSEM, TASE: TSEM) is a global specialty foundry leader and its fully owned subsidiary Jazz Semiconductor, a Tower Group Company is a leader in Analog-Intensive Mixed-Signal (AIMS) foundry solutions. Tower and Jazz manufacture integrated circuits with geometries ranging from 1.0 to 0.13-micron and provide industry leading design enablement tools to allow complex designs to be achieved quickly and more accurately. Tower and Jazz offer a broad range of process technologies including Digital, Mixed-Signal and RFCMOS, HV CMOS, BCD, Non-Volatile Memory (NVM), Embedded NVM, MEMS, and CMOS Image Sensors. To provide world-class customer service, Tower and Jazz maintain two manufacturing facilities in Israel and one in the U.S. with additional manufacturing capacity available in China through partnerships with ASMC and HHNEC. For more information, please visit www.towersemi.com and www.jazzsemi.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 and 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. 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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