

TOWER SEMICONDUCTOR LTD.

Up to \$12,500,000 of Ordinary Shares

We are party to a Standby Equity Purchase Agreement, or the SEPA, with YA Global Master SPV Ltd., or YA Global, for the offer and sale of up to \$12,050,000 of our ordinary shares, par value New Israeli Shekels 1.00 per share, offered by this prospectus supplement and the accompanying base prospectus. We may from time to time issue all or a portion of these shares to YA Global at 97% of the market price for the ordinary shares (as determined in accordance with the SEPA) at the time of such issuance. This prospectus supplement also covers the issuance of any ordinary shares that we may issue to YA Global in payment of all or a portion of the \$450,000 in commitment fees which are payable to YA Global under the SEPA at the market price for the ordinary shares (as determined in accordance with the SEPA) at the time of payment.

We have been advised by YA Global that the resale of any ordinary shares by YA Global will be made by means of ordinary brokers' transactions on the NASDAQ Global Market, the Tel-Aviv Stock Exchange or otherwise at market prices prevailing at the time of sale or at prices related to the prevailing market prices. For additional information on the methods of sale that may be used by YA Global, see the section entitled "Plan of Distribution" on page S-5.

Our ordinary shares are quoted on the NASDAQ Global Market and the Tel-Aviv Stock Exchange under the symbol "TSEM." On February 4, 2010, the last reported sales prices of our ordinary shares on the NASDAQ Global Market and the Tel-Aviv Stock Exchange were \$1.32 per share and NIS 4.92 per share, respectively.

Investing in our securities involves a high degree of risk. See "Risk Factors" referred to and included beginning on page S-2 of this prospectus supplement.

In connection with the resale of our ordinary shares, YA Global may be deemed to be an "underwriter" within the meaning of the Securities Act of 1933, as amended, and the compensation of YA Global may be deemed to be underwriting commissions or discounts.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus supplement or the accompanying base prospectus. Any representation to the contrary is a criminal offense.

YA Global Master SPV Ltd.

The date of this prospectus supplement is February 5, 2010

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You should rely only on the information contained or incorporated by reference in this prospectus supplement and the accompanying base prospectus. We have not authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. We are not making an offer to sell these securities in any jurisdiction where the offer and sale is not permitted.

You should not assume that the information appearing in this prospectus supplement or the base prospectus is accurate as of any date other than the date on the front cover of the respective documents. You should not assume that the information contained in the documents incorporated by reference in this prospectus supplement or the base prospectus is accurate as of any date other than the respective dates of those documents. Our business, financial condition, results of operations, and prospects may have changed since that date.

PROSPECTUS SUMMARY

About This Prospectus Supplement

This prospectus supplement and the accompanying base prospectus are part of a registration statement on Form F-3 (Registration No. 333- 163196) that we filed with the Securities and Exchange Commission using a “shelf” registration process. Under this shelf process, we may offer to sell any combination of the securities described in the base prospectus in one or more offerings up to a total dollar amount of \$50,000,000. The base prospectus provides you with a general description of the securities we may offer. Each time we sell securities under this shelf registration, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement may also add, update or change information contained in the base prospectus. You should read both this prospectus supplement and the accompanying base prospectus, including all documents incorporated by reference.

This prospectus supplement provides specific details regarding the issuance of up to \$12,500,000 of our ordinary shares pursuant to the SEPA. To the extent there is a conflict between the information contained in this prospectus supplement and the base prospectus, you should rely on the information in this prospectus supplement. This prospectus supplement, the base prospectus and the documents we incorporate by reference herein and therein include important information about us and our ordinary shares, and other information you should know before investing. You should read both this prospectus supplement and the base prospectus, together with the additional information described in the base prospectus under the heading “Where You Can Find More Information; Incorporation of Information by Reference.”

Company Overview

We are a pure-play independent specialty wafer foundry dedicated to the manufacture of semiconductors. Typically, pure-play foundries do not offer products of their own, but focus on producing integrated circuits, or ICs, based on the design specifications of their customers. We manufacture semiconductors for our customers primarily based on third party designs and our own process technology and engineering support. We currently offer the manufacture of ICs with geometries ranging from 1.0 to 0.13-micron. We also provide design services and complementary technical services. ICs manufactured by us are incorporated into a wide range of products in diverse markets, including consumer electronics, personal computers, communications, automotive, industrial and medical device products.

In January 2001, we commenced construction of a state-of-the-art wafer fabrication facility, which we refer to as Fab 2, located in Migdal Haemek, Israel and adjacent to our first facility, Fab 1. In 2003, we completed the infrastructure of Fab 2 and commenced production at this Fab. Fab 2 is designed to operate in geometries of 0.18-micron and below, using advanced materials and advanced CMOS technology licensed from Freescale and Toshiba and other technologies that we developed and will develop independently or with development partners. Depending on the process technology and product mix, when fully ramped-up, we estimate that Fab 2 will be able to achieve capacity levels of approximately 40,000 wafers per month. We have not completed the full ramp-up of Fab 2. The timing of that decision and its implementation will depend upon several factors, including funding, cost and availability of equipment and market conditions.

In September 2008, we acquired Jazz Technologies in a stock for stock transaction. Jazz is now an independent semiconductor foundry focused on specialty process technologies for the manufacture of analog and mixed-signal semiconductor devices. Jazz’s specialty process technologies include advanced analog, radio frequency, high voltage, bipolar and silicon germanium bipolar complementary metal oxide (“SiGe”) semiconductor processes, for the manufacture of analog and mixed-signal semiconductors. Jazz’s customers use the analog and mixed-signal semiconductor devices in products they design that are used in cellular phones, wireless local area networking devices, digital TVs, set-top boxes, gaming devices, switches, routers and broadband modems. Jazz operates one semiconductor fabrication facility in Newport Beach, California, in which it currently produces the majority of its products and in which all of Jazz’s process research and development is performed.

Our executive offices are located in the Ramat Gavriel Industrial Park, Post Office Box 619, Migdal Haemek, 23105 Israel, and our telephone number is 972-4-650-6611.

Additional information about us and our operations may be found on our web site: www.towersemi.com. Information on our website is not incorporated by reference in this prospectus.

RISK FACTORS

An investment in our securities involves a high degree of risk. ***In addition to the risk factors set forth below relating to this offering, you should carefully consider the risk factors in the base prospectus in the section entitled "Risk Factors"***. These risk factors may be amended or supplemented or superseded from time to time by other reports we file with the SEC in the future. If any of the events or developments described therein actually occurs, our business, financial condition and results of operations may suffer. In that case, the value of our securities may decline, and you could lose all or part of your investment.

Risks Related to this Offering

Investors may experience significant dilution as a result of the sale of shares under the SEPA or the issuance of ordinary shares under outstanding securities convertible into or exercisable for our ordinary shares.

The sale of our ordinary shares pursuant to the SEPA will result in dilution of the percentage of our ordinary shares held by current and future shareholders. If we were to sell all \$12,500,000 of the ordinary shares which we may offer for sale under the SEPA at a price equal to \$1.32, which was the last reported sale price for our ordinary shares on the NASDAQ Global Market on February 4, 2010, we would issue approximately 9,469,697 additional ordinary shares under the SEPA, in addition to our 198,961,286 shares currently outstanding. Because the sales pursuant to the SEPA will be made based on prevailing market prices at the time advances are made, the prices at which we sell these shares and the number of shares we will issue will vary, perhaps significantly, with the market price of our ordinary shares. In addition we may issue additional ordinary shares upon the conversion or exercise of our outstanding convertible notes, capital notes, warrants, options and other rights to acquire our ordinary shares. See "Capitalization" for a summary of the ordinary shares issuable under such securities.

Our ability to raise funds under the SEPA will depend on several factors, including the trading volume for our ordinary shares.

While under the SEPA, YA Global is committed to purchase our ordinary shares in accordance with the terms of the SEPA, YA Global may not make any advances which would result in YA Global owning more than 4.99% of our outstanding ordinary shares. Our ability to sell additional shares to YA Global and raise funds under the SEPA will depend on YA Global's ability to sell shares previously purchased under the SEPA in a timely manner. This will depend, among other factors, on the trading volume for our shares on the NASDAQ and the Tel-Aviv Stock Exchange and prevailing conditions in the capital markets generally. There is no assurance as to the extent to which we will be able to utilize the SEPA to fund our operations.

Sales of shares to YA Global pursuant to the SEPA and the resale of such shares by YA Global may result in declines in the price of our stock.

The ordinary shares purchased by YA Global under the SEPA are freely tradable and YA Global may promptly sell the shares we issue to them under the SEPA in the public markets. Such sales, and the potential for such sales, could cause the market price of our ordinary shares to decline significantly. To the extent of any such decline, any subsequent advances requested by us under the SEPA would require the issuance of a greater number of ordinary shares to YA Global to raise a given dollar amount. This may result in significant dilution to our shareholders.

USE OF PROCEEDS

During the remaining term of the SEPA, we may receive up to \$12,050,000 in proceeds from the sale of shares of ordinary shares to YA Global pursuant to the SEPA. We anticipate, and have represented to YA Global in the SEPA, that the proceeds received under the SEPA will be utilized for general corporate purposes, which may include working capital, purchases of equipment or technologies, manufacturing improvements, capital expenditures and repayment of debt. We may also issue up to \$450,000 of our ordinary shares in payment of all or part of the remaining commitment fee payable to YA Global under the SEPA.

CAPITALIZATION

The following table sets forth our long-term debt, debentures and capitalization as of March 31, 2009 on an actual basis. This table was prepared in accordance with the US GAAP. The financial data is derived from our unaudited interim consolidated financial statements as of September 30, 2009.

	<u>Actual</u> <u>(US dollars in</u> <u>thousands)</u>	<u>_____</u>
Short term bank loan		\$ 4,440
Long-term bank loans		184,687
Convertible debentures excluding current maturities		231,868
Long-term customers' advances		12,412
Other long-term liabilities		<u>55,020</u>
Shareholders' equity (deficit):		
Ordinary Shares, NIS 1.00 par value per share; 1,100,000,000 authorized shares, 188,240,247 issued shares* and 186,940,247 outstanding shares	\$ 47,036	
Additional paid-in capital	682,275	
Capital notes	311,472	
Equity component of convertible debentures and cumulative stock based compensation	21,273	
Accumulated other comprehensive loss	(2,176)	
Accumulated deficit	(977,153)	
Treasury stock, 1,300,000 shares	<u>(9,072)</u>	
Total shareholders' equity		<u>73,655</u>
Total capitalization		<u>\$ 562,082</u>

*Includes 1,300,000 treasury shares

The information set forth on an actual basis in the foregoing table excludes the following securities as of December 31, 2009:

- (i) approximately 26.7 million ordinary shares issuable upon exercise of options granted to employees and directors at a weighted average exercise price of \$1.14;
- (ii) 23.4 million ordinary shares issuable upon exercise of options granted to our Chief Executive Officer at a weighted average exercise price of \$1.15;
- (iii) 11.5 million ordinary shares issuable upon exercise of options granted to our Chairman of the Board at an exercise price of \$0.29;

- (iv) 5.4 million ordinary shares issuable upon exercise of warrants issued to our banks and Israel Corp. with an exercise price of \$2.04 per share exercisable until June 2013.
- (v) 0.9 million ordinary shares issuable upon exercise of warrants issued to our banks in connection with our credit facility with an exercise price of \$6.17 per share exercisable until September 2011;
- (vi) 1.1 million ordinary shares issuable upon exercise of warrants issued to our banks in connection with our credit facility with an exercise price of \$0.89 per share exercisable until September 2012;
- (vii) 30.8 million ordinary shares issuable upon conversion of our debentures convertible series E until January 2013, issued pursuant to our June 2007 public offering in Israel at conversion rate of approximately \$1.1;
- (viii) 8.3 million ordinary shares issuable upon exercise of warrants we issued to our banks with an exercise price of \$1.21 in connection with the July 2005 amendment to our facility agreement exercisable until June 2013;
- (ix) 9.6 million ordinary shares issuable upon conversion of our debentures convertible series B until December 2011, pursuant to the prospectus dated December 15, 2005 at conversion rate of \$1.1;
- (x) 398.9 million ordinary shares issuable upon conversion of the equity equivalent convertible capital notes we issued to our banks and to Israel Corp. ;
- (xi) 8 million ordinary shares issuable upon exercise of warrants series 6, with an exercise price of approximately \$1.06 per share and exercisable until August 2011;
- (xii) 5.2 million ordinary shares issuable upon exercise of warrants series 5 sold in our private placements completed in November 2006, with an exercise price of approximately \$2.5 per share and exercisable until December 2010;
- (xiii) 44.2 million ordinary shares issuable upon conversion of our debentures convertible series C until December 2011, issued pursuant to our June 2006 public offering in Israel at conversion rate of approximately \$1.15;
- (xiv) 6.9 million ordinary shares issuable upon exercise of the warrants series I issued in our March 2007 private placement at exercise price of \$0.74 exercisable until March 2012.
- (xv) 59.5 million ordinary shares issuable upon exercise of warrants, with an exercise price of approximately \$2.78 per share and exercisable until March 2011;and
- (xvi) 30.3 million ordinary shares issuable upon conversion of our debentures convertible until December 2011 at conversion rate of \$4.07.

This information does not take into account potential dilutive issuances of securities pursuant to our credit facility agreement and warrants issuable to our banks since the number of shares issuable will depend upon future transactions in which we may engage and/or the market price of our shares and/or other conditions.

PLAN OF DISTRIBUTION

On August 11, 2009, we entered into a Standby Equity Purchase Agreement, or SEPA, with YA Global. The SEPA was amended by Amendment No. 1 thereto dated August 27, 2009 and Amendment No. 2 thereto dated February 4, 2010. The SEPA provides that, upon the terms and subject to the conditions set forth therein, YA Global is committed to purchase up to \$25,000,000 of our ordinary shares over a two-year commitment period. Through the date hereof, YA Global has purchased an aggregate of \$12,950,000 of our ordinary shares. Therefore under the terms of the SEPA, from time to time through August 11, 2011, and at our sole discretion, we may present YA Global with advance notices to purchase \$12,050,000 of our ordinary shares. For each ordinary share purchased under the SEPA, YA Global will pay 97% of the lowest volume weighted average price, or VWAP, of the ordinary shares on the Tel-Aviv Stock Exchange during the five trading day pricing period following the advance notice. The aggregate amount of each advance requested cannot exceed \$5,000,000, unless otherwise mutually agreed to by us and YA Global. The amount issued pursuant to any advance also cannot cause the aggregate number of ordinary shares beneficially owned by YA Global and its affiliates to exceed 4.99% of the then outstanding ordinary shares. If an advance notice requests the purchase of shares exceeding any of these amounts, that portion of the advance notice will be deemed to be automatically withdrawn.

Promptly after the end of the five trading day period following delivery of the advance notice, we will deliver to YA Global the requisite number of shares against payment by YA Global of the advance amount requested, subject to our satisfaction of certain conditions under the SEPA. There is no arrangement for funds to be received in an escrow, trust, or similar arrangement. We may continue to deliver additional advance notices until the commitment amount is purchased or the expiration of the two-year period.

For each advance notice, we may indicate a minimum acceptable price, which cannot be more than 95% of the last closing price of our ordinary shares on the Tel-Aviv Stock Exchange at the time of delivery of the advance notice. If during the five trading day pricing period following any advance notice the VWAP for the ordinary shares is below the indicated minimum acceptable price, the amount of the advance will generally be reduced by 20% for each day the VWAP is below the minimum acceptable price and that trading day will be excluded from the pricing period for purposes of determining the purchase price.

The SEPA provides for the payment of a \$650,000 commitment fee to YA Global which may be paid either in cash, in our ordinary shares (using the VWAP on the Tel-Aviv Stock Exchange on the day immediately preceding the payment date) or some combination of cash and ordinary shares. We have already paid \$200,000 of the commitment fee. We are obligated to pay YA Global the \$450,000 balance of the commitment fee, \$200,000 on or about February 20, 2010 and \$250,000 on or about August 19, 2010,. This prospectus supplement also covers the issuance of any shares to YA Global in payment of all or part of the balance of the commitment fee.

We may terminate the SEPA upon 15 trading days' prior notice to YA Global, as long as there are no advances outstanding and we have paid to YA Global all amounts then due. A copy of the SEPA and copies of the amendments thereto are attached as exhibits to our Report on Form 6-K as filed with the SEC on February 5, 2010.

In addition to our issuance of ordinary shares to YA Global pursuant to the SEPA, this prospectus supplement also covers the resale of those shares from time to time by YA Global to the public. In connection with YA Global's sale of our ordinary shares, YA Global may be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation paid to YA Global may be deemed to be underwriting commissions or discounts. We have agreed in the SEPA to provide indemnification to YA Global against certain civil liabilities.

We will file a prospectus supplement indicating the price and number of ordinary shares issued in connection with each sale of ordinary shares under the SEPA.

YA Global has informed us that it will use an unaffiliated broker-dealer to effectuate any sales of ordinary shares that it may purchase from us pursuant to the SEPA. Such sales will be made on the NASDAQ, the Tel-Aviv Stock Exchange or otherwise at prices and at terms then prevailing or at prices related to the then current market price. Each such unaffiliated broker-dealer may be an underwriter within the meaning of Section 2(a)(11) of the Securities Act. YA Global has informed us that each such broker-dealer will receive commissions from YA Global which will not exceed customary brokerage commissions.

Our ordinary shares may be sold by YA Global in one or more of the following manners:

- ordinary brokerage transactions and transactions in which the broker solicits purchasers;
- a block trade in which the broker or dealer so engaged will attempt to sell the shares as agent, but may position and resell a portion of the block as principal to facilitate the transaction;
- to a broker-dealer as principal and resale by the broker-dealer for its account; or
- a combination of any such methods of sale.

YA Global has agreed that, during the term of the SEPA, neither YA Global nor its affiliates will engage in any short sales or hedging transactions with respect to our ordinary shares, provided that upon receipt of an advance notice YA Global may sell shares that it is obligated to purchase under such advance notice prior to taking possession of such shares.

YA Global and any unaffiliated broker-dealer will be subject to liability under the federal securities laws and must comply with the requirements of the Securities Act and the Exchange Act, including without limitation, Rule 10b-5 and Regulation M under the Exchange Act. These rules and regulations may limit the timing of purchases and sales of ordinary shares by YA Global or any unaffiliated broker-dealer. Under these rules and regulations, YA Global and any unaffiliated broker-dealer:

- may not engage in any stabilization activity in connection with our securities;
- must furnish each broker which offers shares of our ordinary shares covered by the prospectus that is a part of our Registration Statement with the number of copies of such prospectus and any prospectus supplement which are required by each broker; and
- may not bid for or purchase any of our securities or attempt to induce any person to purchase any of our securities other than as permitted under the Exchange Act.

These restrictions may affect the marketability of the ordinary shares by YA Global and any unaffiliated broker-dealer.