Registration No. 333-

As filed with the Securities and Exchange Commission on May 17, 2011

### SECURITIES AND EXCHANGE COMMISSION WASHINGTON, D.C. 20549

#### FORM S-8

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

TOWER SEMICONDUCTOR LTD. (Exact name of Registrant as specified in its charter)

Israel (State or other jurisdiction of incorporation or organization) Not Applicable (I.R.S. Employer Identification No.)

P.O. Box 619 Migdal Haemek, Israel, 23105 972-4-650-6611 (Address and telephone number of Registrant's principal executive offices)

> 2009 Employee Share Incentive Plan 2009 Chairman Share Incentive Plan (Full title of plans)

Tower Semiconductor USA 4300 Stevens Creek Blvd., Suite 175 San Jose, California 95129 Tel: 408-551-6500 Facsimile: 408-551-6509 (Name, address and telephone number of agent for service)

Copies of all Correspondence to:

DAVID H. SCHAPIRO, ESQ. Yigal Arnon & Co. 1 Azrieli Center Tel Aviv, 67021 Israel Tel: 972-3-608-7856 SHELDON KRAUSE, ESQ. Eilenberg & Krause LLP 11 East 44th Street New York, NY 10017 Tel: 212-986-9700

### CALCULATION OF REGISTRATION FEE

		Proposed Maximum Proposed Maximum Amount of				
	Amount to be	Offering Pri	ice A	Aggregate	Registration	
Title of Securities to be Registered	Registered (1)	Per Share	(	Offering Price	Fe	e
Ordinary Shares, par value NIS 1.00						
per share ("Ordinary Shares") (relating	to					
2009 Employee Share Incentive Plan)	8,500,000 (2)	\$ 0.29	(3) \$	5 2,465,000	\$	286.19
Ordinary Shares, par value NIS 1.00						
per share ("Ordinary Shares") (relating	to					
2009 Employee Share Incentive Plan)	19,792,881(4)	\$ 1.26	(5) \$	5 24,939,030	\$	2,895.42
Ordinary Shares, par value NIS 1.00						
per share ("Ordinary Shares") (relating	to					
2009 Chairman of the Board of						
Directors Share Incentive Plan)	11,500,000(6)	0.29	(3) \$	3,335,000	\$	387.19
TOTAL:			\$	5 30,739,030	\$	3,568.80

- (1) This Registration Statement also registers an indeterminate number of Ordinary Shares which may become issuable pursuant to the adjustment and anti-dilution provisions of the plans and options to which this Registration Statement relates.
- (2)Represents shares that may be issued pursuant to options which have been granted to the Registrant's Chief Executive Officer pursuant to the Registrant's 2009 Employee Share Incentive Plan.
- (3)Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(h) under the Securities Act of 1933, based upon a Proposed Maximum Offering Price Per Share of \$0.29, which is the exercise price per share of such options.
- (4) Represents shares that may be issued pursuant to options which may in the future be granted to the Registrant's Chief Executive Offer pursuant to the Registrant's 2009 Employee Share Incentive Plan.
- (5)Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(h) under the Securities Act of 1933, based upon the average of the high and low prices of the Registrant's Ordinary Shares on the Nasdaq Global Market on May 13, 2011.
- (6) Represents shares that may be issued pursuant to options which have been granted to the Registrant's Chairman of the Board pursuant to the Registrant's 2009 Chairman Share Incentive Plan.

As permitted by Rule 429 under the Securities Act of 1933, this registration statement contains a combined resale prospectus that relates to ordinary shares covered by this registration statement as well as ordinary shares covered by prior registration statements on Form S-8, No. 333-166428, filed by the registrant on April 30, 2010, No. 333-153710, filed by the registrant on September 29, 2008, No. 333-147071, filed by the Registrant on November 1, 2007, No. 333-138837, filed by the registrant on November 20, 2006 and No. 333-83204, filed by the registrant on February 21, 2002. Upon effectiveness, this registration statement will serve as a post-effective amendment to such prior registration statements.

### EXPLANATORY NOTE

This Registration Statement on Form S-8 filed by Tower Semiconductor Ltd., a company organized under the laws of the State of Israel (the "Registrant"), is being filed to register 28,292,881 shares that may be issued pursuant to options which have been granted, or may in the future be granted to the Registrant's Chief Executive Officer, pursuant to the Registrant's 2009 Employee Share Incentive. As of the date hereof, options to purchase 8,500,000 shares had been granted to the Registrant's Chief Executive Officer under the 2009 Employee Share Incentive Plan and options to purchase up to an additional 19,792,881 shares may be granted to him in the future under the Plan. This Registration Statement also is being filed to register 11,500,000 shares that may be issued pursuant to options that have been granted to the Registrant's Chairman under the 2009 Chairman Share Incentive Plan, representing all of the options which may be granted under such Plan.

The documents containing the information specified in Part I of this Registration Statement on Form S-8 will be sent or given to participants in the Plan as specified by Rule 428(b)(i) under the Securities Act of 1933, as amended (the "Securities Act"). Such documents are not required to be, and are not being, filed by us with the Securities and Exchange Commission ("SEC"), either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act. Such documents, together with the documents incorporated by reference herein pursuant to Item 3 of Part II of this Registration Statement on Form S-8, constitute a prospectus that meets the requirements of Section 10(a) of the Securities Act.

As used herein or any in any document incorporated by reference hereto, the "Company", "Tower Semiconductor Ltd.", "Registrant", "we", "us", or "our" refers to Tower Semiconductor Ltd. and its consolidated subsidiaries.

### PART I

### INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

As permitted by the rules of the Securities and Exchange Commission, this Registration Statement omits the information specified in Part I of Form S-8.

## PART II

### INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents By Reference.

The following documents filed with the SEC by the Registrant pursuant to the Securities Exchange Act of 1934 are incorporated by reference in this registration statement:

- Annual Report on Form 20-F for the fiscal year ended December 31, 2010 (filed on May 17, 2011); and
- The description of the Company's Ordinary Shares which is contained in its Registration Statement on Form 8-A declared effective on October 25, 1994.

All documents subsequently filed by the Company pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act, prior to the filing of a post-effective amendment which indicates that all shares offered hereby have been sold or which deregisters all then remaining unsold, shall be deemed to be incorporated by reference in this registration statement and to be a part hereof from the date of filing of such documents. We may also incorporate any Form 6-K subsequently filed or furnished by us to the SEC prior to the filing of any such post-effective amendment, by

identifying in such Form 6-K that it is being incorporated by reference herein, and any Forms 6-K so identified shall be deemed to be incorporated by reference in this registration statement and to be a part hereof from the date of filing of such documents. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this registration statement to the extent that a statement contained herein or in any other subsequently filed document which also is incorporated or deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this registration statement.

Item 4. Description of Securities.

Not Applicable.

Item 5. Interests of Named Experts and Counsel.

Not Applicable.

Item 6. Indemnification of Directors and Officers.

The Israeli Companies Law-1999, or the Companies Law, provides that a company may include in its articles of association provisions allowing it to:

- 1. partially or fully, exempt in advance, an office holder of the company from his responsibility for damages caused by the breach of his duty of care to the company, except for damages caused to the Company due to any breach of such Office Holder's duty of care towards the company in a "distribution" (as defined in the Companies Law).
- 2.enter into a contract to insure the liability of an office holder of the company by reason of acts or omissions committed in his capacity as an office holder of the company with respect to the following:
  - (a) the breach of his duty of care to the company or any other person;
- (b) the breach of his fiduciary duty to the company to the extent he acted in good faith and had a reasonable basis to believe that the act or omission would not prejudice the interests of the company; and
  - (c) monetary liabilities or obligations which may be imposed upon him in favor of other persons.
    - 3. indemnify an office holder of the company for:
  - (a) monetary liabilities or obligations imposed upon, or actually incurred by, such officer holder in favor of other persons pursuant to a court judgment, including a compromise judgment or an arbitrator's decision approved by a court, by reason of acts or omissions of such officer holder in his or her capacity as an office holder of the company;
- (b)reasonable litigation expenses, including attorney's fees, actually incurred by such office holder or imposed upon him or her by a court, in an action, suit or proceeding brought against him or her by or on behalf of us or by other persons, or in connection with a criminal action from which he or she was acquitted, or in connection with a criminal action which does not require criminal intent in which he was convicted, in each case by reason of acts or omissions of such officer holder in his or her capacity as an office holder; and
- (c)reasonable litigation expenses, including attorneys' fees, actually incurred by such office holder due to an investigation or a proceeding instituted against such office holder by an authority competent to administrate such an investigation or proceeding, and that was finalized without the filing of an indictment against such office holder and without any financial obligation imposed on such office holder in lieu of criminal proceedings, or that was finalized without the filing of an indictment against such office holder but with financial obligation imposed on such office holder but with financial obligation imposed on such office holder but with financial obligation imposed on such office holder in lieu of criminal proceedings of a crime which does not require proof of criminal intent, in each case by reason of acts of such officer holder in his or her capacity as an office holder of the company.

The Companies Law provides that a company's articles of association may provide for indemnification of an office holder post-factum and may also provide that a company may undertake to indemnify an office holder in advance, as described in:

i. sub-section 3(a) above, provided such undertaking is limited to and actually sets forth the occurrences, which, in the opinion of the company's board of directors based on the current activity of the company, are, at the time such undertaking is provided, foreseeable, and to an amount and degree that the board of directors has determined is reasonable for such indemnification under the circumstances; and

ii. sub-sections 3(b) and 3(c) above.

The Companies Law provides that a company may not indemnify or exempt the liabilities of an office holder or enter into an insurance contract which would provide coverage for the liability of an office holder with respect to the following:

- o a breach of his fiduciary duty, except to the extent described above;
- o a breach of his duty of care, if such breach was done intentionally, recklessly or with disregard of the circumstances of the breach or its consequences, but excluding a breach due to negligence only;
  - o an act or omission done with the intent to unlawfully realize personal gain; or
    - o a fine or monetary settlement imposed upon him.

Under the Companies Law, the term "office holder" may include a director, managing director, general manager, chief executive officer, executive vice president, vice president, other managers directly subordinate to the managing director and any other person fulfilling or assuming any such position or responsibility without regard to such person's title.

The grant of an exemption, an undertaking to indemnify or indemnification of, and procurement of insurance coverage for, an office holder of a company requires, pursuant to the Companies Law, the approval of our audit committee, or, following May 14, 2011 (the effective date of a new amendment to the Companies Law), of a special compensation committee to the extent that such committee complies with the statutory requirements which apply to the audit committee, and board of directors, and, in certain circumstances, including if the office holder is a director, the approval of our shareholders in addition to the approval of the audit committee and board of directors.

We have entered into an insurance contract for directors and officers and have procured indemnification insurance for our office holders to the extent permitted by our Articles of Association.

We have also entered into indemnification agreements with certain of our directors and officers to the extent permitted by our Articles of Association. The indemnification agreements provide that, subject only to mandatory provisions of applicable law to the contrary, we will indemnify such individuals against the obligations and expenses described above with respect to acts performed in the capacity of an office holder, subject, in certain instances, to (i) the obligation or expense being imposed or expended in connection with a specified event; and (ii) a specific cap. The indemnification agreements also exempt such individuals from liability for damage caused or to be caused to us as a result of a breach of such individual's duty of care, subject only to mandatory provisions of applicable law to the contrary.

Item 7. Exemption From Registration Claimed.

Not applicable.

# Item 8. Exhibits.

Exhibit Numbers	Description of Document
3.1	Articles of Association of the Registrant, approved by shareholders on November 14, 2000, as amended (incorporated by reference to Exhibit 3.1 of the Registrant's Registration Statement on Form F-1, File No. 333-126909)
3.2	Amendment to the Articles of Association of the Registrant (approved by shareholders on December 7, 2003) (incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-8, File No. 333-117565)
3.3	Amendment to Articles of Association of the Registrant (approved by shareholders on September 28, 2006) (incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-8, File No. 333-138837)
3.4	Amendment to Articles of Association of Registrant (approved by shareholders on September 24, 2008) (incorporated by reference to Exhibit 3.4 of the Registrant's Registration Statement on Form S-8, File No. 333-153710)
4.1	2009 Employee Share Incentive Plan (incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-8, File No. 333-166428)
4.2	Form of Grant Letter to Israeli Employees for the 2009 Employee Share Incentive Plan (incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-8, File No. 333-166428)
4.3	Form of Grant Letter to U.S. Employees for the 2009 Employee Share Incentive Plan (incorporated by reference to Exhibit 4.3 of the Registrant's Registration Statement on Form S-8, File No. 333-166428)
4.4	Form of Grant Letter to non-Israeli/non-U.S. Employees for the 2009 Employee Share Incentive Plan (incorporated by reference to Exhibit 4.4 of the Registrant's Registration Statement on Form S-8, File No. 333-166428)
4.5	2009 Chairman Share Incentive Plan (incorporated by reference to Exhibit 4.20 of the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2010 (filed on May 17, 2011)
5.1	Opinion of Yigal Arnon & Co.
23.1	Consent of Yigal Arnon & Co. (contained in their opinion constituting Exhibit 5.1)
23.2	Consent of Brightman Almagor Zohar & Co.

24.1 Power of Attorney (included on signature page)

Item 9. Undertakings.

(a) The undersigned Registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:

i. To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

- ii. To reflect in the prospectus any facts or events arising after the effective date of this Registration Statement (or the most recent post-effective amendment hereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and
- iii. To include any material information with respect to the plan of distribution not previously disclosed in this Registration Statement or any material change to such information in this Registration Statement;

provided, however, that paragraphs (a)(1)(i) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in this Registration Statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities: The undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

- i. Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
- ii. Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
- iii. The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

iv. Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the Registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in this Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in such Act and will be governed by the final adjudication of such issue.

### PROSPECTUS

#### 35,811,813 Ordinary Shares

This Prospectus relates to the resale, from time to time, our Chief Executive Officer, our Chairman of the Board and certain of our directors named herein under the caption "Selling Shareholders" (the "Selling Shareholders") to the public of up to 35,811,813 of our ordinary shares, par value NIS 1.00 per share ("Ordinary Shares"), which may be acquired by the Selling Shareholders through the exercise of stock options granted to them by our Board of Directors, or a committee appointed by the board. See "Selling Shareholders."

The Selling Shareholders may sell all or any portion of these ordinary shares in one or more transactions through (i) Nasdaq, the Tel Aviv Stock Exchange, in the over-the-counter market, in privately negotiated transactions or otherwise; (ii) directly to purchasers or through agents, brokers, dealers or underwriters; (iii) at market prices prevailing at the time of sale, at prices related to such prevailing market prices, or at negotiated prices; or (iv) or any other means described in the section entitled "Plan of Distribution."

Our ordinary shares are listed on the Nasdaq Global Market under the symbol "TSEM" and on the Tel Aviv Stock Exchange in Israel under the symbol "TSEM." On May 13, 2011, the last reported sale price of our ordinary shares on the Nasdaq Global Market was \$1.26 per share. On May 15, 2011, the last reported sale price of our ordinary shares on the Tel Aviv Stock Exchange was NIS 4.27 per share.

The securities offered hereby involve a high degree of risk. See "Risk Factors" beginning on page 2.

None of the U.S. Securities and Exchange Commission, the Israeli Securities Authority or any state securities commission have approved or disapproved of these securities or passed upon the adequacy, completeness or accuracy of this prospectus. Any representation to the contrary is a criminal offense under the laws of the United States and the laws of the State of Israel.

The date of this prospectus is May 17, 2011

# TABLE OF CONTENTS

ABOUT TOWER SEMICONDUCTOR LTD.	1
RISK FACTORS	2
CAPITALIZATION	3
<u>USE OF PROCEEDS</u>	4
PLAN OF DISTRIBUTION	5
SELLING SHAREHOLDERS	7
DESCRIPTION OF SHARE CAPITAL	8
FOREIGN EXCHANGE CONTROLS AND OTHER LIMITATIONS	9
TAXATION	9
DIVIDEND POLICY	12
LEGAL MATTERS	12
EXPERTS	12
ENFORCEABILITY OF CIVIL LIABILITIES AND AGENT FOR SERVICE OF PROCESS IN THE UNITED STATES	12
WHERE YOU CAN FIND MORE INFORMATION; INCORPORATION OF INFORMATION BY REFERENCE	12

#### ABOUT TOWER SEMICONDUCTOR LTD.

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, generally using the customer's proprietary circuit designs. In some cases, we use third-party or our own proprietary design elements. 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. We provide wafer fabrication services to fabless IC companies and IDMs and enable smooth integration of the semiconductor design and manufacturing processes. 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.

We are focused on establishing leading market share in high-growth specialized markets by providing our customers with high-value wafer foundry services. Our historical focus has been standard digital complementary metal oxide semiconductor ("CMOS") process technology, which is the most widely used method of producing ICs. We are currently focused on the emerging opportunities in the fields of CMOS image sensors, mixed-signal, radio frequency CMOS (RFCMOS), bipolar CMOS (BiCMOS), and silicon-germanium BiCMOS (SiGe BiCMOS or SiGe), high voltage CMOS, radio frequency identification (RFID) technologies and power management. To better serve our customers, we have developed and are continuously expanding our technology offerings in these fields. Through our expertise and experience gained over seventeen years of operation, we differentiate ourselves by creating a high level of value for our clients through innovative technological processes, design and engineering support and services, competitive manufacturing indices, and dedicated customer service.

In September 2008, we completed the merger with Jazz Technologies, Inc. ("Jazz Technologies"), the sole stockholder of Jazz Semiconductor, Inc. ("Jazz Semiconductor"), an independent semiconductor foundry focused on specialty process technologies for the manufacture of analog intensive mixed-signal semiconductor devices. As a result of this transaction, Jazz Technologies became a wholly owned subsidiary of Tower.

We currently operate three manufacturing facilities—our Fab 1 and Fab 2 facilities in Israel and our Jazz facility in Newport Beach, California. The capacity in each of our facilities at any particular time is variable and depends on the combination of the processes being used and the product mix being manufactured. Hence, it may be significantly lower at certain times as a result of certain of our combinations that may require more processing steps than others. We have the ability to rapidly change the mix of production processes in use in order to respond to changing customer needs and maximize utilization of the fab. In general, our ability to increase our manufacturing capacity has been achieved through the addition of equipment, improvement in equipment utilization, the reconfiguration and expansion of the existing clean room area and the construction of an additional clean room area.

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 at our web site: www.towerjazz.com. Information on our website is not incorporated by reference in this prospectus.

### **RISK FACTORS**

An investment in our securities is speculative and involves a high degree of risk. Therefore, you should not invest in our securities unless you are able to bear a loss of your entire investment. You should carefully consider the risk factors described in our periodic reports filed with the SEC, including those specified in our Annual Report on Form 20-F for the fiscal year ended December 31, 2010 (filed on May 17, 2011) in the section captioned "Risk Factors", which is incorporated by reference in this prospectus. You should carefully consider those risks together with the other information in this prospectus before deciding to invest in our securities. If any of those risks actually occur, our business, financial condition and results of operations could be materially and adversely affected. In that case, the trading price of our ordinary shares could decline, and you may lose all or part of your investment.

2

### CAPITALIZATION

The following table sets forth our long-term debt, debentures and capitalization as of December 31, 2010 on an actual basis. This table was prepared in accordance with US GAAP and the financial data is derived from our consolidated financial statements as of December 31, 2010.

(US dollars in thousands)

Short term bank debt and current maturities of debentures	\$ 122,179
Long-term loans from banks	111,882
Debentures	247,598
Long-term customers' advances	9,257