LATTICE SEMICONDUCTOR CORP
Form 10-K
February 26, 2019
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UNITED STATES
SECURITIES AND
EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K
(Mark One)

þ	ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE FISCAL YEAR ENDED DECEMBER 29, 2018
	or
¨	TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM _____ TO _____

Commission file number: 000-18032

LATTICE SEMICONDUCTOR CORPORATION
(Exact name of registrant as specified in its charter)

Delaware	93-0835214
(State of Incorporation)	(I.R.S. Employer Identification Number)

5555 NE Moore Court, Hillsboro, Oregon 97124-6421
(Address of principal executive offices) (Zip Code)
Registrant's telephone number, including area code: (503) 268-8000

_____

Securities registered pursuant to Section 12(b) of the Act:

_____

(Title of Class)	(Name of each exchange on which registered)
Common Stock, $.01 par value	NASDAQ Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ¨ No þ

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ¨ No þ

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes þ No ¨

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes þ No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of the registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. þ

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an "emerging growth company." See the definitions of “large accelerated filer”, “accelerated filer”, “smaller reporting company” and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ¨	Accelerated filer þ	Non-accelerated filer ¨
Smaller reporting company ¨	Emerging growth company ¨	

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ¨

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ¨ No þ

Aggregate market value of voting stock held by non-affiliates of the registrant as of June 29, 2018	$575,075,952
Number of shares of common stock outstanding as of February 21, 2019	131,598,332

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this Report, to the extent not set forth herein, is incorporated herein by reference from the registrant's definitive proxy statement relating to the 2019 Annual Meeting of Stockholders, which definitive proxy statement shall be filed with the Securities and Exchange Commission within 120 days after the end of the fiscal year to which this Report relates.

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Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These involve estimates, assumptions, risks and uncertainties. Any statements about our expectations, beliefs, plans, objectives, assumptions or future events or performance are not historical facts and may be forward-looking. We use words or phrases such as “anticipates,” “believes,” “could,” “estimates,” “expects,” “intends,” “plans,” “predicts,” “projects,” “should,” “continue,” “ongoing,” “future,” “potential” and similar words or phrases to identify forward-looking statements.

Examples of forward-looking statements include, but are not limited to, statements about: our transitions to newly adopted accounting standards; the effect of new accounting standards on our consolidated financial statements and financial results; the effects of sales mix on our gross margin in the future; our judgments involved in revenue recognition; our strategies and beliefs regarding the markets in which we compete or may compete; our expectations regarding emerging trends and market opportunities, our expectations regarding market infrastructure and growth areas, our future investments in research and development and our product leadership; our expectations regarding cash provided by or used in operating activities; our expectations regarding royalties under collaborative agreements; our expectations regarding our ability to service our debt obligations; our expectations regarding restructuring charges under and timing of restructuring plans; our expectation regarding payment of foreign and U.S. federal income taxes; the sufficiency of our financial resources to meet our operating and working capital needs through at least the next 12 months; our intention to continually introduce new products and enhancements and reduce manufacturing costs; our expectation of production volumes and the associated revenue streams for certain mobile handset providers; our continued participation in or sources of revenue from standard setting initiatives or consortia that develop and promote the High-Definition Multimedia Interface ("HDMI") specification including our expectations regarding sharing of HDMI royalty revenues; our plans to continue to monetize our patent portfolio through sales of non-core patents; our beliefs regarding our disclosure controls and procedures; the adequacy of assembly and test capacity commitments; our expectations regarding taxes and tax adjustments, particularly with respect to the 2017 Tax Act; our expectations regarding the outcome of tax and other audits; our valuation allowance and uncertain tax positions; our beliefs regarding the adequacy of our liquidity, capital resources and facilities; our intention to sublease vacated leased space in San Jose, California and Portland, Oregon; our expectations regarding our implementation of a company-wide enterprise resource planning system; our beliefs regarding legal proceedings, and our expectations regarding the impact of sanctions imposed by the United States Department of Commerce.

Forward-looking statements involve estimates, assumptions, risks, and uncertainties that could cause actual results to differ materially from those expressed in the forward-looking statements. The key factors, among others, that could cause our actual results to differ materially from the forward-looking statements included global economic conditions and uncertainty, including as a result of trade related restrictions or tariffs, the concentration of our sales in certain end markets, particularly as it relates to the concentration of our sales in the Asia Pacific region, market acceptance and demand for our existing and new products, market and technology trends, our ability to license or sell our intellectual property, any disruption of our distribution channels, the impact of competitive products and pricing, unexpected charges, delays or results relating to our restructuring plans, unexpected complications with our implementation of a company-wide enterprise resource planning system, the effect of any downturn in the economy on capital markets and credit markets, unanticipated taxation requirements or positions of the U.S. Internal Revenue Service or other taxing authority, unanticipated effects of tax reform, or unexpected impacts of accounting guidance. In addition, actual results are subject to other risks and uncertainties that relate more broadly to our overall business, including those more fully described herein and that are otherwise described from time to time in our filings with the Securities and Exchange Commission, including but not limited to the items discussed in “Risk Factors” in Item 1A of Part I of this Annual Report on Form 10-K.

You should not unduly rely on forward-looking statements because our actual results could differ materially from those expressed in any forward-looking statements made by us. In addition, any forward-looking statement applies only as of the date on which it is made. We do not plan to, and undertake no obligation to, update any forward-looking statements to reflect events or circumstances that occur after the date on which such statements are made or to reflect the occurrence of unanticipated events.

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PART I

Item 1. Business

Overview

Lattice Semiconductor Corporation and its subsidiaries (“Lattice,” the “Company,” “we,” “us,” or “our”) develop semiconducto technologies that we monetize through products, solutions, design services, and licenses. We engage in smart connectivity, control, and compute solutions, providing intellectual property ("IP") and low-power, small form-factor programmable logic devices that enable global customers to quickly and easily develop innovative, smart, and connected products. We help their products become more aware, interact more intelligently, and make better and faster connections. In an increasingly intense global technology market, we help our customers get their products to market faster than their competitors. Our broad end-market exposure extends from mobile devices and consumer electronics to industrial and automotive equipment, communications and computing infrastructure, and licensing and services.

Our historic focus was on programmable logic devices ("PLDs"). In 2011, we made the strategic decision to competitively differentiate from other established programmable logic companies with ultra-low power and ultra-small sized field programmable gate array ("FPGA") solutions, a type of PLD. As a result, we acquired a leader in this technology, SiliconBlue Technologies, Inc. in 2011, and FPGA solutions and PLDs comprised our core business. In 2015, we broadened our product offerings by acquiring Silicon Image, Inc. (“Silicon Image”), a connectivity standards developer and semiconductor company. Over the past year we have re-focused more significantly on our core business of FPGA solutions and have divested various non-core assets and product lines acquired in our 2015 acquisition of Silicon Image.

Our FPGA devices provide us with a strong, growing base of control, connect, and compute technologies. We believe there are multiple growth areas that will allow us to increase our addressable market. In particular, we believe there are several emerging trends in servers, infrastructure, and smart devices that are opportunities for Lattice:

- With the growth of data centers, our “processor agnostic” solutions are ideal for control and connect functions in enterprise and data center server applications.
- With the expected continued communications infrastructure build-out from 5G deployment, Lattice solutions are being adopted to control and connect a variety of functions in critical systems.
- With the increase in electrification and the proliferation of sensors in smart factories and automobiles, our low power, small form factor solutions are ideal for everything from battery powered systems and sensor applications to video formats.
- With the increase in artificial intelligence and machine learning and a multitude of applications at the network edge, Lattice has the capabilities to provide solutions. These applications often act independently and need to make instantaneous decisions. As such, they need their own computing and learning capabilities to perform functions like face detection, image recognition, and video analytics – capabilities that we have today as a result of technology obtained with the acquisition of Silicon Image.

To serve these emerging needs, devices require high levels of processing power, speed, and memory, the need to operate with low power consumption, and the ability to integrate complex functionality into a highly compact footprint. These requirements align to the capabilities of our FPGA devices. Our flexible, low power, small form factor FPGAs put us in a unique position to meet these growing market needs.

Our Markets and Customers

We sell our products globally in three primary end markets groups: Mobile and Consumer, Communications and Computing, and Industrial and Automotive. We also provide Intellectual Property licensing and services to these end markets.

In the Mobile and Consumer Market, you can find our solutions making both consumer and prosumer products smarter and thinner, including: smart-phones, wearables, accessories such as chargers and docks, smart home devices, Virtual Reality ("VR") headsets, digital SLR cameras, drones, and other connected devices.

Our Mobile and Consumer customers are driven by the need to deliver richer and more responsive experiences. They typically require:

- More intelligence and computing power. Products need to be always-on and always-aware.
- Longer battery lives for handheld devices and reduced energy consumption for plugged-in devices.
- Real-time transmission of higher resolution video content on larger screen sizes.
- Fast design cycles. Products must be quickly and easily differentiated.
- Smaller form factors. Products need to lay flatter on the wall or fit more easily in people’s pockets.
- Various levels of video processing and analytics.

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Lattice solutions help solve these challenges with the following products and services:

- FPGAs bring multiple benefits to our customers. An FPGA's parallel architecture enables faster processing than competing devices, such as processors, allowing for a user experience with shorter pauses and fewer delays. Our FPGAs have among the lowest power consumption in the industry, enabling the application processor and other high power components to remain dormant longer, resulting in longer battery life. Finally, with some of the industry's smallest packages, we enable thinner end products.
- A full suite of standards-based HDMI Video Connectivity Application Specific Standard Products ("ASSPs") enable the immersive audio-visual experience that consumers demand.
- Intellectual Property Licensing and Services enable customers who wish to develop a proprietary solution to use our proven technology.

Our proprietary solutions help our customers get their products to market faster than typical development cycles. With re-programmability and flexibility, our FPGAs inherently allow our customers to have quicker product development. Our deep engagement with industry standards bodies gives us an intimate knowledge of various video technologies and enables our customers to accelerate their innovation. All of Lattice's solution time-to-market advantages are critical given shorter product life cycles and higher competition in our customers' end markets.

In the Communications and Computing Market, our solutions play key roles in computing systems such as servers and clients, heterogeneous network ("HetNet") small cell base stations, network backhaul, wired access aggregation, and other related applications.

Our Communications and Computing customers need to "connect anything to everything," at ever-increasing data rates.

- As data center servers become smaller and power costs become more dominant, there is a growing requirement for smaller form factors with lower installed and operational costs. Lattice's low cost per look-up table, and high Input-Output ("I/O") count enable customers to use fewer devices in much smaller spaces.
- Additionally, they need simplified control logic, enhanced security, and rigorous power and thermal management.
- Networks typically require progressively higher bandwidth and increased reliability as more data is demanded by consumer and other connected devices. Bandwidth demands are also driven by the rapid transition to a cloud-based infrastructure.
- As wireless cells become more compact without fans, there is a growing requirement for smaller form factors optimized for low power consumption.

We help customers solve these problems with the following products:

- FPGAs optimized for I/O expansion, low cost look-up tables, hardware acceleration, hardware management, and affordability. Our FPGAs consume power at very low rates, which reduces operating costs. Their small form factor enables higher functional density in less space. Finally, our FPGAs are I/O rich, which allows for more connections with system application specific integrated circuits ("ASICs") and ASSPs. Our programmable mixed signal devices make power and thermal management easy and reliable.

Examples of our products enabling intelligent automation in the Industrial and Automotive Market include machine vision, robotics, factory automation, industrial handhelds, surveillance cameras and DVRs, digital signage, driver assistance, automotive infotainment, servers, and data center networks.

Our Industrial and Automotive customers face numerous challenges:

- As smart factories develop, sensors are proliferating and machine vision is becoming higher definition, in turn requiring increasing amounts of data to be gathered, connected, and processed.
- Cars, trucks, and trains are also becoming smarter and more connected. Drivers and passengers are demanding better in-cabin experiences including entertainment, diagnostics, and enhanced safety — often involving multiple displays, cameras, and sensors.

- As factories and automotive manufacturers continue their evolution of computerization, power reduction, faster time to design in and market, lower costs are becoming increasingly normal.

Our product portfolio helps solve these challenges. Our small-sized, low-power FPGAs not only provide the I/O expansion, bridging, connectivity, and processing inherent in FPGAs to the full Industrial Market, but they also form the backbone of several integrated solutions, including complete HD camera and DVR solutions on a single FPGA device and Human-Machine Interfaces (HMI) on a chip.

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Our Products, Services, and Competition

We deliver two types of semiconductor devices to help solve our customers' problems: FPGAs and Video Connectivity ASSPs. We also serve our customers with IP licensing and various other services.

Field Programmable Gate Arrays (“FPGAs”)

FPGAs are regular arrays of logic that can be custom-configured by the user through software. This programmability allows our customers flexibility and reduced time to market while allowing us to offer the chips to many different customers in many different markets. Five product family lines anchor our FPGA offerings:

- The ECP families are our “Connectivity & Acceleration FPGAs.” They offer customers the lowest cost per gate, Digital Signal Processing ("DSP") capability, and Serialize-Deserialize ("SerDes") connectivity. ECP devices are optimized for the Communications and Computing market but also find significant use in the Industrial and Automotive market.
- The MachXO families are known as “Bridging and Expansion FPGAs.” They are control oriented and offer the lowest cost per I/O, along with the lowest cost per look-up table. MachXO families are widely used across our three primary target markets: Communications and Computing, Industrial and Automotive, and Mobile and Consumer.
- iCE40 families are known as the “World’s Smallest FPGAs.” Their small size and ultra-low power make them the optimal products for customizing Consumer mobile and Industrial handheld products. The iCE40 UltraLite was named “Digital Semiconductor Product of the Year” by the 2015 Elektra European Electronics Industry Awards. In 2016, we released the latest member of the family, iCE40 UltraPlus, focused on smart-phone and Internet of things ("IoT") edge devices.
- CrossLink was introduced in 2016 as the world’s first video “pASSP” (programmable Application Specific Standard Part). CrossLink combines the power and speed benefits of hardened video camera and display bridging cores with the flexibility of FPGA fabric. CrossLink was the 2016 recipient of the “Editor’s Choice Award” by EEPW magazine.
- Programmable Mixed Signal devices, such as our Platform Manager 2 and L-ASC10 combine programmable digital logic with analog functionality to help customers manage power, thermal, and control planes in real time.

To enable our customers to get to market faster we support the FPGAs with intellectual property cores, reference designs, development kits, and design software.

Competition for our FPGAs is fragmented:

- While ASICs, ASSPs, and microcontrollers have historically dominated high-volume market segments through low cost and reduced power consumption, our FPGAs have become small enough with sufficiently low power consumption that we are now considered by customers in use cases where they need the architectural benefits of FPGAs, namely programmability with its accelerated time-to-market and the speed that comes from parallelism. Not only can customers use FPGAs to add new features and support new standards, but if a customer’s design is not working as intended, the customer can quickly change it using the programmability of our FPGAs through software. In contrast, ASICs and ASSPs require time consuming and expensive redesign and fabrication. Against microcontrollers, we differentiate our products with smaller sized packages and higher performance.
- Our main FPGA competitors are Xilinx and Intel. Both make FPGAs that are generally focused on the high-density end of the market, making devices that are up to a full order of magnitude larger than ours with the associated increases in power and size. We differentiate from them with ultra-low power and very small sized packages.

Video Connectivity Application Specific Standard Products ("ASSPs")

In the Mobile and Consumer market, consumers need to connect many different types of audio-video devices and expect them to work seamlessly together. We refer to these connections as “Video Connectivity.” Industry standards, such as HDMI, and USB Type-C, ensure that consumers are able to successfully make those connections. These industry standards support resolutions up to 8K, High Dynamic Range, Deep Color, and HDCP 2.2 content protection.

Our Video Connectivity ASSPs implement these standards along with value-added features and allow consumer original equipment manufacturers ("OEMs") to quickly get feature rich and interoperable products to market.

Our Video Connectivity ASSPs perform many functions, including ensuring interoperability, enhancing picture quality, converting between resolutions, and transmitting / receiving content without the need for additional components. Specific device types include port processors, port controllers, video processors, transmitters, receivers, bridges, and converters. These devices are used in products such as mobile phones, UHD TVs, home theater systems, HDMI cable extenders, automotive infotainment, PCs, video accessories, projectors, and monitors.

In general, our Video Connectivity competition includes:

- HDMI functionality offered in either discrete devices or integrated into system-on-a-chip products. These are offered by a small number of companies.
- In-house semiconductor solutions designed by large consumer electronics OEMs.
- Alternative HD connectivity technologies such as DisplayPort and MiraCast, which are offered by select companies.

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We believe that we have a competitive advantage because of our deep engagement with industry standards bodies. This involvement has enabled us to bring our “standards plus” products and IP to market more quickly and gives our customers confidence that we have the expertise needed to successfully execute.

Intellectual Property (IP) Licensing and Services

Lattice has a broad set of technological capabilities and many U.S. and international patents. We generate revenue from our technology portfolio via upfront fees and on-going royalty payments through the following activities:

- Standard IP Licensing - these activities include our participation in two consortia for the licensing of HDMI and MHL technologies to customers who adopt the technology into their products and voluntarily report their usage and royalties. The royalties are split between consortium members, including us.
- IP Core Licensing - some customers need Lattice’s technology for specific functions or features, but for various reasons are not able to use our silicon solutions. In those cases, we may license them IP cores, which they can integrate into their own ASICs. In contrast to the use of consortia, these licensing activities are generally performed internally.
- Patent Monetization - we sell certain patents from our portfolio generally for technology that we are no longer actively developing. The revenue from these sales generally consists of upfront payments and potential future royalties.
- IP Services - projects and design services for customers who wish to develop specific solutions that harness our proven technology and expertise.

Research and Development

We place a substantial emphasis on new product development, where return on investment is the key driver, and believe that continued investment in research and development is required to maintain and improve our competitive position. Our product development activities emphasize new proprietary products, advanced packaging, enhancement of existing products and process technologies, improvement of software development tools, development of innovative technology standards, and enhanced services. Research and development activities occur primarily in Hillsboro, Oregon; San Jose, California; Shanghai, China; and Muntinlupa City, Philippines.

We believe that a continued commitment to research and development is essential to maintaining product leadership and providing innovative new product offerings and, therefore, we expect to continue to make significant future investments in research and development.

Operations

We do not manufacture our own silicon products. We maintain strategic relationships with large, established semiconductor foundries to source our finished silicon wafers. This strategy allows us to focus our internal resources on product and market development, and eliminates the fixed cost of owning and operating semiconductor manufacturing facilities. We are able to take advantage of the ongoing advanced process technology development efforts of semiconductor foundries, and to choose to apply those technologies when they become most economically beneficial to us and to our customers.

Lattice and Fujitsu Limited ("Fujitsu") have entered into agreements pursuant to which Fujitsu manufactures our next generation products on its 130nm, 90nm and 65nm CMOS process technologies, as well as embedded flash memory in these technical nodes. United Microelectronics Corporation ("UMC") manufactures certain of our next generation 40nm products. Taiwan Semiconductor Manufacturing Company Ltd. (“TSMC”) manufactures our acquired SiliconBlue and Silicon Image products. Seiko Epson ("Epson") manufactures our 500nm, 350nm, 250nm and 180nm products.

All of our assembly and volume test operations are performed by outside suppliers. We perform certain test operations as well as reliability and quality assurance processes internally. We have achieved and maintained ISO9001:2015 Quality Management Systems Certification and released a line of products qualified to the AEC-Q100 Reliability Standard.

We rely on third party vendors to provide cost-effective and efficient supply chain services. Among other activities, these outsourced services relate to direct sales logistics, including order fulfillment, inventory management and warehousing, and shipment of inventory to third party distributors.

Wafer Fabrication

We source silicon wafers from our foundry partners, Fujitsu and Epson in Japan, and TSMC and UMC in Taiwan, pursuant to agreements with each company and their respective affiliates. We negotiate wafer volumes, prices and other terms with our foundry partners and their respective affiliates on a periodic basis.

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Assembly

After wafer fabrication and initial testing, we ship wafers to independent subcontractors for assembly. During assembly, wafers are separated into individual die and encapsulated in plastic packages. We have qualified two major assembly partners, Advanced Semiconductor Engineering ("ASE") and Amkor Technology ("Amkor') and are second sourced where volume and customer requirements are necessary. All ASE and Amkor manufacturing of our products is in Asia. We negotiate assembly prices, volumes and other terms with our assembly partners and their respective affiliates on a periodic basis.

We currently offer an extensive list of standard products in lead (Pb) free packaging. Our lead-free products meet the European Parliament Directive entitled "Restrictions on the use of Hazardous Substances" ("RoHS"). A select and growing subset of our ROHS compliant products are also offered with a "Halogen Free" material set.

Testing (Sort and Final Test)

We electrically sort test the die on most wafers prior to shipment for assembly. Wafer sort testing is primarily performed by Amkor in Japan and our second source King Yuan Electronics Co. (“KYEC”) in Taiwan. Some legacy products are tested at Unisem Group in Indonesia.

Following assembly, but prior to customer shipment, each product undergoes final testing and quality assurance procedures. Final testing is performed by ASE and Amkor, our assembly partners in Asia.

Sales and Revenue

We generate revenue by monetizing our technology and patents using two go-to-market strategies:

- Product and Technology Sales: Involves direct and channel sales of silicon-based products with their associated software solutions and services.
- Intellectual Property Licensing and Services: Involves the licensing or sale of intellectual property that we have developed, some of which we use in our products, and certain design services that we may provide.

Seasonality

While we periodically may experience some seasonal trends in the sale of our products, general economic conditions and the cyclical nature of the end markets we serve generally have a greater impact on our business and financial results than seasonal trends.

Backlog

Our backlog consists of orders from distributors and certain OEMs that require delivery within the next year. Historically, our backlog has not been a predictor of future sales or customer demand for the following reasons:

- Purchase orders, consistent with common industry practices, can generally be revised or canceled up to 30 days before the scheduled delivery date without significant penalty.
- Our backlog for distributors is valued at list price, which in most cases is substantially higher than the prices ultimately recognized as revenue.
- A sizable portion of our revenue comes from our "turns business," where the product is ordered and delivered within the same quarter.

A portion of our revenue arises from vendor-managed inventory arrangements where the timing and volume of customer utilization is difficult to predict.

Sales and Customers

We primarily sell our products to end customers from Lattice Semiconductor Corporation or our wholly-owned subsidiary, Lattice SG Pte. Ltd. We sell both directly and through a network of independent manufacturers' representatives. Additionally, we sell indirectly through independent distributors. We also employ a direct sales management and field applications engineering organization to support our end customers and indirect sales resources. Our end customers are primarily original equipment manufacturers ("OEMs") in the Communications and Computing, Mobile and Consumer, and Industrial and Automotive end markets.

We have agreements with 20 manufacturers' representatives in North America. We have established sales channels in over 44 foreign countries and maintain a network of 10 international sales representatives. A substantial portion of our sales are made through distributors.

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We provide global technical support to our end customers with engineering staff based at our headquarters, product development centers and selected field sales offices. We maintain numerous domestic and international field sales offices in major metropolitan areas.

Resale of product by distributors accounted for approximately 83% of our net revenue in fiscal 2018, approximately 77% of our net revenue in fiscal 2017, and approximately 73% of our net revenue in fiscal 2016. We expect our distributors to generate a significant portion of our revenue in the future. We depend on our distributors to sell our products to end customers, complete order fulfillment, and maintain sufficient inventory of our products. Our distributors also provide technical support and other value-added services to our end customers. We have two global distributors. We also have regional distribution in Asia, Japan, Israel, and North America, and we sell through three major on-line distributors.

In fiscal years 2018, 2017, and 2016, our revenue was broadly distributed across end markets and end customers, with no individual end customer accounting for more than 10% of the total revenue.

Revenue from foreign sales as a percentage of total revenue was 90%, 87%, and 88%, for fiscal 2018, 2017, and 2016, respectively. We assign revenue to geographies based on ship-to location of the end customer, where available, and based upon the location of the distributor to which the product was shipped otherwise (see "Geographic Information" in Note 21 - Segment and Geographic Information to our Consolidated Financial Statements in Part II, Item 8). Both foreign and domestic sales are denominated in U.S. dollars.

Intellectual Property, Patents, and Licensing

Intellectual Property

We seek to protect our products and technologies primarily through patents, trade secrecy measures, copyrights, mask work protection, trademark registrations, licensing restrictions, confidentiality agreements and other approaches designed to protect proprietary information. There can be no assurance that others may not independently develop competitive technology not covered by our intellectual property rights or that measures we take to protect our technology will be effective.

Patents

We hold numerous United States and international patents and have patent applications pending in the United States and internationally. Our current patents will expire at various times between 2019 and 2037, subject to our payment of periodic maintenance fees. There can be no assurance that pending or future patent applications will result in issued patents, or that any issued patents will survive challenges to their validity. Although we believe that our patents have value, there can be no assurance that our patents, or any additional patents that may be issued in the future, will provide meaningful protection from competition. We believe that our success will depend primarily upon the technical expertise, experience, and creativity, and the sales and marketing abilities of our personnel.

Patent and other proprietary rights infringement claims are common in our industry. There can be no assurance that, with respec