VISHAY INTERTECHNOLOGY INC
Form 10-K
February 16, 2018
UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

ý ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2017
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 1-7416

Vishay Intertechnology, Inc.
(Exact name of registrant as specified in its charter)

Delaware	38-1686453
(State or other jurisdiction of incorporation or organization)	(IRS employer identification no.)

63 Lancaster Avenue
Malvern, Pennsylvania 19355-2143
(Address of principal executive offices)

(610) 644-1300
(Registrant's telephone number, including area code)

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

Common Stock, $0.10 par value	New York Stock Exchange
(Title of class)	(Exchange on which registered)

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 ý No

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 ý
Note – Checking the box above will not relieve any registrant required to file reports under Section 13 or 15(d) of the Exchange Act from their obligations under those Sections.

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 ý No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes ý 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 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. ý

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

Large accelerated filer	ý	Accelerated filer	
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 checkmark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No ý

The aggregate market value of the voting stock held by non-affiliates computed by reference to the price at which the common equity was last sold as of the last business day of the registrant's most recently completed second fiscal quarter ($16.60 on July 1, 2017), assuming conversion of all of its Class B common stock held by non-affiliates into common stock of the registrant, was $2,237,000,000. There is no non-voting stock outstanding.

As of February 14, 2018, registrant had 132,007,719 shares of its common stock and 12,097,427 shares of its Class B common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement, which will be filed within 120 days of December 31, 2017, are incorporated by reference into Part III.

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Vishay Intertechnology, Inc.
Form 10-K for the year ended December 31, 2017

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PART I

Item 1. BUSINESS

Our Business

Vishay Intertechnology, Inc. ("Vishay," the "Company," "we," "us," or "our") is a leading global manufacturer and supplier of discrete semiconductors and passive components. Semiconductors include MOSFETs, diodes, and optoelectronic components. Passive components include resistive products, capacitors, and inductors. Discrete semiconductors and passive components are essential elements of virtually every type of electronic circuit. They support the microprocessor chips and other integrated circuits ("ICs") that coordinate and control the functions of electronic devices and equipment. We offer our customers "one-stop shop" access to one of the most comprehensive electronic component product lines of any manufacturer in the United States, Europe, and Asia.

Our semiconductor components are used for a wide variety of functions, including power control, power conversion, power management, signal switching, signal routing, signal blocking, signal amplification, two-way data transfer, one-way remote control, and circuit isolation. Our passive components are used to restrict current flow, suppress voltage increases, store and discharge energy, control alternating current ("AC") and voltage, filter out unwanted electrical signals, and perform other functions. Our components are used in virtually every type of product that contains electronic circuitry, in the industrial, computing, automotive, consumer, telecommunications, power supplies, military, aerospace, and medical markets.

The Vishay Story

In the 1950's, the late Dr. Felix Zandman, Vishay's founder, was issued patents for his PhotoStress® coatings and instruments, used to reveal and measure the distribution of stresses in structures such as airplanes and cars under live load conditions. His research in this area led him to develop Bulk Metal® foil resistors – ultra-precise, ultra-stable resistors with performance far beyond any other resistor available to date.

In 1962, Dr. Zandman, with a loan from the late Alfred P. Slaner, founded Vishay to develop and manufacture Bulk Metal foil resistors. Concurrently, J.E. Starr developed foil resistance strain gages, which also became part of Vishay. Throughout the 1960's and 1970's, Vishay established itself as a technical and market leader in foil resistors, PhotoStress products, and strain gages. These products were included with the measurements and foil resistor businesses that we spun off into an independent, publicly-traded company named Vishay Precision Group, Inc. ("Vishay Precision Group" or "VPG") through a tax-free stock dividend to our stockholders on July 6, 2010.

In 1985, Vishay began to expand its product line through various strategic acquisitions, including the resistor companies Dale Electronics, Draloric Electronic, and Sfernice. In the early 1990's, Vishay applied its acquisition strategy to the capacitor market, with the major acquisitions of Sprague Electric, Roederstein, and Vitramon. In 2002, Vishay acquired BCcomponents, the former passive components business of Philips Electronics and Beyschlag, which greatly enhanced Vishay's global market position in passive components. Over the years, we have made several smaller passive components acquisitions to gain market share, penetrate different geographic markets, enhance new product development, round out our product lines, or grow our high margin niche businesses. These include Electro-Films, Cera-Mite, and Spectrol in 2000; Tansitor and North American Capacitor Company (Mallory) in 2001; the thin film interconnect business of Aeroflex in 2004; Phoenix do Brasil in 2006; the wet tantalum capacitor business of KEMET Corporation in 2008; the resistor businesses of Huntington Electric in 2011; HiRel Systems in 2012; MCB Industrie in 2013; Holy Stone Polytech in 2014; and UltraSource in 2018.

In the late 1990's, Vishay began expanding its product lines to include discrete semiconductors. In 1998, Vishay acquired the Semiconductor Business Group of TEMIC, which included Telefunken and an 80.4% interest in

Siliconix, producers of MOSFETs, RF transistors, diodes, optoelectronics, and power and analog switching integrated circuits. Vishay's next semiconductor acquisition came in 2001, with the purchase of the infrared components business of Infineon Technologies, which was followed the same year by Vishay's acquisition of General Semiconductor, a leading global manufacturer of rectifiers and diodes. In 2005, Vishay made a successful tender offer for the minority interest in Siliconix. In 2007, Vishay acquired the Power Control Systems business of International Rectifier, further enhancing our product offerings. These acquisitions propelled Vishay into the top ranks of discrete semiconductor manufacturers. In 2014, Vishay increased its position in optoelectronic sensors through its acquisition of Capella, a fabless IC design company specializing in optoelectronic components.

We continue to implement the vision, strategy, and culture articulated by Dr. Zandman as we continue to work tirelessly to enhance value for our stockholders.

Vishay was incorporated in Delaware in 1962 and maintains its principal executive offices at 63 Lancaster Avenue, Malvern, Pennsylvania 19355-2143. Our telephone number is (610) 644-1300.

Our Competitive Strengths

Global Technology Leader

We were founded based on the inventions of Dr. Felix Zandman and we continue to emphasize technological innovation as a driver of growth. Many of our products and manufacturing techniques, technologies, and packaging methods have been invented, designed, and developed by Dr. Zandman, our engineers, and our scientists. We are currently a worldwide technology and market leader in wirewound and other power resistors, leaded film resistors, thin film SMD resistors, wet and conformal-coated tantalum capacitors, capacitors for power electronics, power rectifiers, low-voltage power MOSFETs, and infrared components.

Research and Development Provides Customer-Driven Growth Solutions

We maintain strategically placed application and product support centers where proximity to customers and our manufacturing locations enables us to more easily gauge and satisfy the needs of local markets. The breadth of our product portfolio along with the proximity of our field application engineers to customers provides increased opportunities to have our components selected and designed into new end products by customers in all relevant market segments. We also maintain research and development personnel and promote programs at a number of our production facilities to develop new products and new applications of existing products, and to improve manufacturing processes and technologies. We plan to grow our business and increase earnings per share, in part, through accelerating the development of new products and technologies and increasing design-in opportunities by expanding our technical resources for providing solutions to customers.

Operational Excellence

We are a leading manufacturer in our industry, with a broad product portfolio, access to a wide range of end markets and sales channels, and geographic diversity. We have solid, well-established relationships with our customers and strong distribution channels. Our senior management team is highly experienced, with deep industry knowledge. Over the past two decades, our management team has successfully restructured our company and integrated several acquisitions. We can adapt our operations to changing economic conditions, as demonstrated by our ability to remain profitable and generate cash through the volatile economic cycle of the recent past.

Broad Market Penetration

We have one of the broadest product lines of discrete semiconductors and passive components among our competitors. Our broad product portfolio allows us to penetrate markets in all industry segments and all regions, which reduces our exposure to a particular end market or geographic location. We plan to grow our business and increase earnings per share, in part, through improving market penetration by expanding manufacturing facilities for our most successful products, increasing technical resources, and developing markets for specialty products in Asia. Our net revenues for the following applicable periods were attributable to customers in the following regions:

	Years Ended December 31,		
	2017	2016	2015
Asia	42%	41 %	40 %
Europe	35%	35 %	34 %
Americas	23%	24 %	26 %

The share of net revenues by end market was as follows:

	Years Ended December 31,		
	2017	2016	2015
Industrial	36%	34 %	35 %
Automotive	28%	28 %	26 %
Computing	8 %	7 %	8 %
Telecommunications	7 %	8 %	10 %
Consumer Products	6 %	7 %	7 %
Power Supplies	6 %	6 %	5 %
Military and Aerospace	5 %	6 %	5 %
Medical	4 %	4 %	4 %

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Strong Track Record of Growth through Acquisitions

Since 1985, we have expanded our product line through various strategic acquisitions, growing from a small manufacturer of precision resistors and resistance strain gages to one of the world's largest manufacturers and suppliers of a broad line of electronic components. We have successfully integrated the acquired companies within our existing management and operational structure, reducing selling, general, and administrative expenses through the integration or elimination of redundant sales and administrative functions, creating manufacturing synergies, while improving customer service. We plan to grow our business and increase earnings per share, in part, through targeted acquisitions. We have often targeted high margin niche business acquisitions. We also target strategic acquisitions of businesses with technology and engineering capabilities that we can use to grow our business.

Strong Free Cash Flow Generation

We refer to the amount of cash generated from operations in excess of our capital expenditure needs and net of proceeds from the sale of assets as "free cash" (see "Overview" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" for "free cash" definition and reconciliation to generally accepted accounting principles ("GAAP")). Due to our strong operational management, cost control measures, efficient capital expenditures, broad product portfolio, and strong market position, we have generated positive "free cash" in each of the past 21 years and "free cash" in excess of $80 million in each of the past 16 years. We expect the benefits of our restructuring and other cost cutting measures (see "Cost Management" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations") to contribute to our "free cash" generation going forward.

Financial Strength and Flexibility

As of December 31, 2017, our cash and short-term investment balance exceeded our debt balance by $924.7 million. We also maintain a credit facility, which provides a revolving commitment of up to $640 million through December 10, 2020, of which $486.2 million was available as of December 31, 2017. Our net cash position and short-term investment balance, available revolving commitment, and strong "free cash" flow generation provide financial strength and flexibility and reduce our exposure to future economic uncertainties.

Our Key Challenges

Economic Environment

Our business and operating results have been and will continue to be impacted by the global economy and the local economies in which our customers operate. Our revenues are dependent on end markets that are impacted by fluctuating consumer and industrial demand, and our operating results can be adversely affected by reduced demand in those markets.

Competition

Our business is highly competitive worldwide, with low transportation costs and few import barriers. Our major competitors, some of which are larger than us, have significant financial resources and technological capabilities. To continue to grow our business successfully, we need to continually develop, introduce, and market new and innovative products, modify existing products, respond to technological change, and customize certain products to meet customer requirements.

Continuous Innovation and Protection of Intellectual Property

Our ability to compete effectively with other companies depends, in part, on our ability to maintain the proprietary nature of our technology. Although we have been awarded, have filed applications for, or have licenses to use, numerous patents in the United States and other countries, there can be no assurance concerning the degree of protection afforded by these patents or the likelihood that pending patents will be issued.

Continuing to Grow through Acquisitions

Our long-term historical growth in revenues and net earnings has resulted in large part from our strategy of growth through acquisitions. For this strategy to remain successful, we need to continue to identify attractive and available acquisition candidates, complete acquisitions on favorable terms, and integrate new businesses, manufacturing processes, employees, and logistical arrangements into our existing management and operating infrastructure.

For a more detailed discussion of the risks and uncertainties inherent in our business, which could materially and adversely affect our business, results of operations or financial condition, see "Risk Factors" in Item 1A.

Key Business Strategies

Since our first acquisition in 1985, we have pursued a business strategy that principally consists of the following elements:

Invest in Innovation to Drive Growth

We plan to continue to use our research and development ("R&D"), engineering, and product marketing resources to continually roll out new and innovative products. As part of our plan to foster intensified internal growth, we have increased our worldwide R&D and engineering technical staff, and increased our technical field sales force in Asia to increase opportunities to design-in our products in local markets. Our ability to react to changing customer needs and industry trends will continue to be key to our success. We intend to leverage our insights into customer demand to continually develop new innovative products within our existing lines and to modify our existing core products to make them more appealing, addressing changing customer needs and industry trends.

We are directing increased funding and are focusing on developing products to capitalize on the connectivity, mobility, and sustainability growth drivers of our business.

Cost Management

We place a strong emphasis on controlling our costs. We focus on controlling fixed costs and reducing variable costs. When our ongoing cost management activities are not adequate, we take actions to maintain our cost competitiveness including restructuring our business to improve efficiency and operating performance.

Growth through Strategic Acquisitions

We plan to continue to expand within the electronic components industry, through the acquisition of other manufacturers of electronic components that have established positions in major markets, reputations for product innovation, quality, and reliability, strong customer bases, and product lines with which we have substantial marketing and technical expertise.

Customer Service Excellence

We maintain significant production facilities in those regions where we market the bulk of our products in order to enhance the service and responsiveness that we provide to our customers. We aim to further strengthen our relationships with customers and strategic partners by providing broad product lines that allow us to provide "one-stop shop" service, whereby they can streamline their design and purchasing processes by ordering multiple types of products.

Our growth plan was designed based on the tenets of the key business strategies listed above.

Products

We design, manufacture, and market electronic components that cover a wide range of functions and technologies. Our product portfolio includes:

MOSFETs Segment

MOSFETs
- Low-Voltage TrenchFET® Power MOSFETs
- Medium-Voltage Power MOSFETs
- High-Voltage Planar MOSFETs
- High-Voltage Super Junction MOSFETs
- Automotive-Grade MOSFETs

ICs
- VRPower® DrMOS Integrated Power Stages
- Power Management and Power Control ICs
- Smart Load Switches
- Analog Switches and Multiplexers

Diodes Segment

Rectifiers
- Schottky Rectifiers
- Ultra-Fast Recovery Rectifiers
- Standard and Fast Recovery Rectifiers
- High-Power Rectifiers/Diodes
- Bridge Rectifiers

Small-Signal Diodes
- Schottky and Switching Diodes
- Zener Diodes
- RF PIN Diodes

Protection Diodes
- TVS TransZorb® and PAR® (uni-directional, bi-directional)
- ESD Protection Diodes (including arrays)

Thyristors/SCR
- Phase-Control Thyristors
- Fast Thyristors

Power Modules
- Input Modules (diodes and thyristors)
- Output & Switching Modules (contain MOSFETs, IGBTs, and diodes)
- Custom Modules

Optoelectronic Components Segment

Infrared Emitters and Detectors

Optical Sensors
- Proximity
- Ambient Light
- Light Index (RGBW, UV, IR)
- Humidity
- Quadrant Sensors
- Transmissive

Resistors & Inductors Segment, continued

Film Resistors, continued
- Power Thick Film Resistors
- Metal Oxide Film Resistors
- Carbon Film Resistors

Wirewound Resistors
- Vitreous, Cemented, and Housed Resistors
- Braking and Neutral Grounding Resistors
- Custom Load Banks

Power Metal Strip® Resistors

Battery Management Shunts

Crowbar and Steel Blade Resistors

Thermo Fuses

Chip Fuses

Pyrotechnic Initiators / Igniters

Variable Resistors
- Cermet Variable Resistors
- Wirewound Variable Resistors
- Conductive Plastic Variable Resistors
- Contactless Potentiometers
- Hall Effect Position Sensors
- Precision Magnetic Encoders

Networks/Arrays

RF and Microwave Resistors

High Voltage Resistors

Dividers

Non-Linear Resistors and Temperature Sensors
- NTC Thermistors
- PTC Thermistors
- Thin Film RTDs
- Varistors

Magnetics
- Power Inductors
- Power Chokes
- High Frequency RF Inductors
- Magnetic Actuators
- Wireless Charging Coils
- Planar Devices
- Transformers
- Custom Magnetics

Connectors

Capacitors Segment

Tantalum Capacitors

• Reflective
Infrared Remote Control Receivers
Optocouplers
• Phototransistor, Photodarlington
• Linear
• Phototriac
• High Speed
• IGBT and MOSFET Driver
Solid-State Relays
LEDs and 7-Segment Displays
Infrared Data Transceiver Modules
Custom Products

Resistors & Inductors Segment
Film Resistors
• Metal Film Resistors
• Thin Film Resistors
• Thick Film Resistors
• Molded Chip Tantalum Capacitors
• Molded Chip Polymer Tantalum Capacitors
• Tantalum MAP Capacitors
• Polymer Tantalum MAP Capacitors
• Coated Chip Tantalum Capacitors
• Solid Through-Hole Tantalum Capacitors
• Wet Tantalum Capacitors
Ceramic Capacitors
• Multilayer Chip Capacitors
• Disc Capacitors
• Multilayer Chip RF Capacitors
• Chip Antennas
• Thin Film Capacitors
Film Capacitors
Power Capacitors
Heavy-Current Capacitors
Aluminum Electrolytic Capacitors
ENYCAP™ Energy Storage Capacitors

We promote our ability to provide "one-stop shop" service to customers, whereby they can streamline their design and purchasing processes by ordering multiple types of products from Vishay. Our technical sales force consisting of field application engineers offers customers the complete breadth of the Vishay portfolio for their applications. We aim to use this broad portfolio to increase opportunities to have our components selected and "designed in" to new end products.

Product Segments

Our products can be divided into two general classes: semiconductors and passive components. Semiconductors are sometimes referred to as "active components" because they require power to function whereas passive components do not require power to function. Our semiconductor and passive components products are further categorized based on their functionality for financial reporting purposes. See Note 15 to our consolidated financial statements for additional information on revenues, income, and total assets by segment.

Semiconductors

Our semiconductor products include metal oxide semiconductor field-effect transistors ("MOSFETs"), Diodes, and Optoelectronic Components. Semiconductors are typically used to perform functions such as switching, amplifying, rectifying, routing, or transmitting electrical signals, power conversion, and power management.

MOSFETs Segment

MOSFETs function as solid state switches to control power. Our MOSFETs business includes both the commodity and non-commodity markets in which we believe that we enjoy a good reputation and strong brand recognition (Siliconix). MOSFETs applications include mobile phones, notebook and desktop computers, tablet computers, digital cameras, televisions, DC/DC and AC/DC switch mode power supplies, solar inverters, automotive and industrial systems. We are a leader in low-voltage TrenchFET MOSFETs and also offer high-voltage MOSFETs. Our MOSFETs product line includes low- and medium-voltage TrenchFET MOSFETs, high-voltage planar MOSFETs, high voltage Super Junction MOSFETs, power integrated circuits (power ICs), and integrated function power devices. We are one of the technology leaders in MOSFETs, with a tradition of innovation in wafer design, packaging, and performance.

Diodes Segment

Diodes route, regulate, and block radio frequency, analog, and power signals; protect systems from surges or electrostatic discharge damage; or provide electromagnetic interference filtering. Our Diodes business is a solid business with a strong market presence in both the commodity and non-commodity markets. The products that comprise our Diodes business represent our broadest product line and include rectifiers, small signal diodes, protection diodes, thyristors/SCRs and power modules. The primary application of rectifiers, found inside the power supplies of virtually all electronic equipment, is to derive DC power from the AC supply. Vishay is the worldwide leader in rectifiers, having a broad technology base and a good position in automotive, industrial, computing and consumer markets. Our rectifier innovations include TMBS® using Trench MOS barrier Schottky rectifier technology, which reduces power loss and improves the efficiency of end systems and eSMP®, the best in class high-current density surface mount packages. Our wide selection of small signal diodes consist of the following functions: switching, tuning, band-switching, RF attenuation and voltage regulation (Zener). They are available in various glass and plastic packaging options and generally are used in electronic circuits, where small currents and high frequencies are involved. Vishay is also one of the market leaders for TVS (transient voltage suppressor) diodes. The portfolio of protection diodes includes ESD protection and EMI filter. Our thyristors or SCR (silicon-controlled rectifiers) are very popular in the industrial high-voltage AC power control applications. The fast growing markets of solar inverter and HEV/EV are the focus of our power modules business (IGBT or MOSFET modules). These modules can be customized to fit in different customer design requirements.

Optoelectronic Components Segment

Optoelectronic components emit light, detect light, or do both. Our Optoelectronic Components business has a strong market presence in both the commodity and non-commodity markets. Our broad range of standard and customer

specific optoelectronic components includes infrared ("IR") emitters and detectors, IR remote control receivers, optocouplers, solid-state relays, optical sensors, light-emitting diodes ("LEDs"), 7-segment displays, and IR data transceiver modules (IrDA®). Our IR remote control receivers are designed for use in infrared remote control, data transmission, and light barrier applications in end products including televisions, set-top boxes, notebook computers, and audio systems. We are the leading manufacturer of IR remote control receivers. Our optocouplers electrically isolate input and output signals. Uses include switch-mode power supplies, consumer electronics, telecommunications equipment, solar inverters, and industrial systems. Our IR data transceiver modules are used for short range, two-way, high-speed, and secure wireless data transfer between electronic devices such as home medical appliances, mobile phones, industrial data loggers, and metering. Our optical sensors product line was considerably strengthened by our acquisition of Capella in 2014. Our optical sensors products include ambient light sensors, optical encoders, integrated photodiode and I/V amplifiers, proximity sensors, color sensors, and UV sensors. Applications include telecommunications, mobile phones, smartphone, handheld devices, digital cameras, laptops, desktop computers, LED backlighting, office automation equipment, household electrical appliance and automotive electronics. Our LEDs are designed for backlighting and illumination in automotive and other applications. Our LEDs include ultra-bright as well as small surface-mount packages, with products available in all standard colors including white.

Passive Components

Our passive components include resistors, capacitors, and magnetics such as inductors and transformers. Passive components are used to store electrical charges, to limit or resist electrical current, and to help in filtering, surge suppression, measurement, timing, and tuning applications.

Resistors and Inductors Segment

Resistors and inductors both impede electric current. Resistors are basic components used in all forms of electronic circuitry to adjust and regulate levels of voltage and current. Inductors use an internal magnetic field to change alternating current phase and resist alternating current. Our Resistors and Inductors business is our original business. We maintain the broadest portfolio of resistor products worldwide. Under current market conditions, the business is solid, predictable, and growing at relatively stable selling prices. We are a market leader with a strong technology base, many specialty products, and strong brand recognition (such as our Dale, Draloric, Beyschlag, Sfernice, and HiRel Systems brands). We focus on higher value markets in specialized industries, while maintaining a complete portfolio of commodity products. We do not aim to be the volume leader in commodity markets.

Resistors vary widely in precision and cost, and are manufactured from numerous materials and in many forms. Linear resistive components are classified as variable or fixed, depending on whether or not their resistance is adjustable. Non-linear resistors function by varying in resistance under influence of temperature (thermistors) or voltage (varistors). They can be used in temperature-measuring applications or as current or voltage-limiting devices. We manufacture virtually all types of fixed resistors, both in discrete and network forms, as well as many variable types.

Vishay resistor innovations include Power Metal Strip® technology. These resistors feature very low resistance and are used to measure changes in current flow (current sensing) or divert current flow (shunting).

Inductor applications include controlling AC current and voltage, filtering out unwanted electrical signals, and energy storage. Vishay inductor innovations include IHLP® low-profile, high-current inductor technology with industry-leading specifications, which is patented and generates royalty revenue. Our low-profile, high-current inductors save circuit board space and power in voltage regulator module ("VRM") and DC to DC converter applications. In addition, we are a worldwide leader in custom magnetic solutions focusing on high performance and high reliability. This field has been substantially strengthened, with the 2012 acquisition of HiRel Systems, broadening our portfolio, customer, and market segment reach.

Capacitors Segment

Capacitors store energy and discharge it when needed. Our Capacitors business consists of a broad range of reliable, high-quality products. We have a strong presence worldwide in specialty markets based on our product performance and reliability and strong brand recognition (including our Sprague, Vitramon, Roederstein, BCcomponents, and ESTA brands). We focus on higher value markets in specialized industries, while maintaining a complete portfolio of commodity products. We do not aim to be the volume leader in commodity markets. Capacitors are used in almost all electronic circuits. They store energy and discharge it when needed. Important applications for capacitors include electronic filtering for linear and switching power supplies; decoupling and bypass of electronic signals for integrated circuits and circuit boards; and frequency control, timing and conditioning of electronic signals for a broad range of applications.

We manufacture products based on all major capacitor technologies: tantalum (molded chip tantalum, coated chip tantalum, solid through-hole tantalum, wet tantalum, and polymer), ceramic (multilayer chip and ceramic disc), film, power, heavy-current, and aluminum electrolytic. Our capacitors range from tiny surface-mount devices for hearing

aids and mobile devices to large power correction capacitors used in renewable energy, heavy industry, and electrical power grids. We are a recognized technology leader in many product ranges, securing our strong position in military and medical markets, and in a wide range of industrial and automotive applications. Our wet tantalum and MicroTan™ technologies are market leaders.

Military Qualifications

We have qualified certain of our products under various military specifications approved and monitored by United States government agencies, and under certain European military specifications. Qualification levels are based in part upon the rate of failure of products. In order to maintain the classification level of a product, we must continuously perform tests on the product and the results of these tests must be reported to the government agencies. If the product fails to meet the requirements for the applicable classification level, the product's classification may be reduced to a lower level. During the time that the classification level is reduced for a product with military application, net revenues and earnings attributable to that product may be adversely affected.

Manufacturing Operations

In order to better serve our customers, we maintain production facilities in locations where we market the bulk of our products, such as the United States, Germany, and Asia. To optimize production efficiencies, we have whenever practicable established manufacturing facilities in countries, such as the Czech Republic, Hungary, India, Israel, Malaysia, Mexico, the People's Republic of China, and the Philippines, where we can benefit from lower labor and tax costs and also benefit from various government incentives, including grants and tax relief.

One of our most sophisticated manufacturing operations is the production of power semiconductor components. This manufacturing process involves two phases of production: wafer fabrication and assembly (or packaging). Wafer fabrication subjects silicon wafers to various thermal, metallurgical, and chemical process steps that change their electrical and physical properties. These process steps define cells or circuits within numerous individual devices (termed "dies" or "chips") on each wafer. Assembly is the sequence of production steps that divides the wafer into individual chips and encloses the chips in structures (termed "packages") that make them usable in a circuit. Both wafer fabrication and assembly phases incorporate wafer level and device level electrical testing to ensure that device design integrity has been achieved.

In the United States, our manufacturing facilities are located in California, Minnesota, Nebraska, New Hampshire, New York, Rhode Island, South Dakota, Vermont, and Wisconsin. In Asia, our main manufacturing facilities are located in the People's Republic of China, the Republic of China (Taiwan), India, and Malaysia. In Europe, our main manufacturing facilities are located in Germany, France, and the Czech Republic. We have substantial manufacturing facilities in Israel. We also have manufacturing facilities in Austria, Dominican Republic, Japan, Hungary, Italy, Mexico, Portugal, and the Philippines. Over the past several years, we have invested substantial resources to increase the efficiency of our plants, which we believe will further reduce production costs.

All of our manufacturing operations have received ISO 9001 certification. ISO 9001 is a comprehensive set of quality program standards developed by the International Standards Organization.

See Note 15 to our consolidated financial statements for financial information by geographic area.

Sources of Supplies

Although most materials incorporated in our products are available from a number of sources, certain materials, including plastics and metals, are available only from a relatively limited number of suppliers or are subject to significant price volatility.

Silicon wafers are the most important raw material for the manufacturing of our semiconductor products. Silicon wafers are manufactured from high-purity silicon, a metalloid. There have at times been industry-wide shortages of high-purity silicon resulting primarily from growing demand of the electronic component and solar power industries, and limited growth in high-purity silicon manufacturing capacities. Shifts in demand for high-purity silicon and in

turn, silicon wafers, have resulted in significant fluctuation in prices of silicon wafers.

We are a major consumer of the world's annual production of tantalum, a metal used in the manufacturing of tantalum capacitors. There are few suppliers that process tantalum ore into capacitor grade tantalum powder.

Certain materials, in addition to tantalum and including tin, tungsten, and gold are available only from a relatively limited number of suppliers, the source for which may be in the Democratic Republic of the Congo ("DRC") or an adjoining country. We are working toward the elimination of materials that directly or indirectly finance or benefit armed groups in the DRC or adjoining countries from our supply chain.

Palladium, a metal used to produce multi-layer ceramic capacitors, is currently found primarily in South Africa and Russia. Palladium is a commodity metal that is subject to price volatility. We periodically enter into short-term commitments to purchase palladium.

Certain metals used in the manufacture of our products, such as copper, are traded on active markets, and can be subject to significant price volatility. Our policy is to enter into short-term commitments to purchase defined portions of annual consumption of these metals if market prices decline below budget.

Inventory and Backlog

We manufacture both standardized products and those designed and produced to meet customer specifications. We maintain an inventory of standardized components and monitor the backlog of outstanding orders for our products.

We include in our backlog only open orders that we expect to ship in the next twelve months. Many of our customers encounter uncertain and changing demand for their products. They typically order products from us based on their forecasts. If demand falls below customers' forecasts, or if customers do not control their inventory effectively, they may cancel or reschedule the shipments included in our backlog, in many instances without the payment of any penalty. Therefore, our backlog at any point in time is not necessarily indicative of the results to be expected for future periods.

Customers and Marketing

We sell our products to original equipment manufacturers ("OEMs"), electronic manufacturing services ("EMS") companies, which manufacture for OEMs on an outsourcing basis, and independent distributors that maintain large inventories of electronic components for resale to OEMs and EMS companies. The distribution of sales by customer type for 2017 is shown below:

Distributors	57%
OEMs	36%
EMS companies	7 %

Our sales organizations are regionally based. While our sales and support procedures are typically similar across all regions, we remain flexible in our ability to offer programs tailored to our customers' specific support requirements in each local area. The aim of our sales organizations is supporting our customers across all product lines, developing new design wins, negotiating contracts, and providing general commercial support as would normally be expected of a large multi-national sales force.

We have an established Strategic Global Account program, which provides each of our top customers with a dedicated Strategic Global Account Manager. Our Strategic Global Account Managers are typically highly experienced salesmen or saleswomen who are capable of providing key customers with the coordination and management visibility required in a complex multi-product business relationship. They typically coordinate the sales, pricing, contract, logistic, quality, and other aspects of the customer's business requirements. The Strategic Global Account Manager normally is the focal point of communication between Vishay and our main customers. We maintain a similar program for our strategic distributors as well.

We work with our customers so that our products are incorporated into the design of electronic equipment at the earliest stages of development and to provide technical and applications support. In addition to our staff of direct field sales personnel, independent manufacturers' representatives, and distributors, our Business Development group maintains teams of dedicated Field Application Engineers ("FAEs") to assist our customers in solving technical problems and in developing products to meet specific customer application needs using our entire product portfolio to provide support for our customers' engineering needs. Organized by market segment, our Business Development FAEs bring specific knowledge of component applications in their areas of expertise in the automotive, telecommunications, computer, consumer/entertainment, industrial, peripherals, digital consumer, and other market segments. With the ultimate goal of a Vishay "design-in" – the process by which our customers specify a Vishay component in their products – this program offers our customers enhanced access to all Vishay technologies while at the same time increasing design wins, and ultimately sales, for us. Most importantly, the process is closely monitored via a proprietary database developed by our Business Development group. Our database captures specific design activities and allows for real-time measurement of new business potential for our management team.

Our top 30 customers have been relatively stable despite not having long-term commitments to purchase our products. With selected customers, we have signed longer term (greater than one year) contracts for specific products. Net revenues from our top 30 customers represent approximately 70% of our total net revenues. No single customer comprises more than 10% of our total net revenues.

In certain areas we also work with sales representatives. The commission expense for these sales representatives is not material.

Research and Development

Many of our products and manufacturing techniques, technologies, and packaging methods have been invented, designed, and developed by Dr. Felix Zandman, our engineers, and our scientists. We maintain strategically placed design centers where proximity to customers enables us to more easily gauge and satisfy the needs of local markets. These design centers are located predominantly in the United States, Germany, Italy, Israel, the People's Republic of China, France, and the Republic of China (Taiwan).

We also employ research and development personnel and promote programs at a number of our production facilities to develop new products and new applications of existing products and to improve manufacturing processes and technologies. This decentralized system encourages product development at individual manufacturing facilities, closer to our customers.

Competition

We face strong competition in various product lines from both domestic and foreign manufacturers. Our primary competitors by product type include:

·MOSFETs: Infineon, Nexperia, ON Semiconductor, Rohm, STMicroelectronics, Toshiba.

·Diodes: Diodes, Inc., Infineon, Nexperia, ON Semiconductor, STMicroelectronics.

·Optoelectronic Components: Broadcom, OSRAM Opto Semiconductors, Rohm, Sharp, Toshiba.

·Resistors and Inductors: Bourns, KOA, Murata, Panasonic, Rohm, TDK-EPCOS, Yageo.

·Capacitors: AVX, KEMET, Murata, Nichicon, Panasonic, TDK-EPCOS, Yageo.

There are many other companies that produce products in the markets in which we compete.

Our competitive position depends on our ability to maintain a competitive advantage on the basis of product quality, know-how, proprietary data, market knowledge, service capability, technological innovation, business reputation, and price competitiveness. Our sales and marketing programs aim to compete by offering our customers a broad range of world-class technologies and products, superior global sales and distribution support, and a secure and multi-location source of product supply.

Recently there has been a considerable amount of consolidation activity in the electronic component industry, some of which involved our primary competitors. We view the industry consolidation as an opportunity for us to gain business as an independent second-source supplier.

Patents and Licenses

We have made a significant investment in securing intellectual property protection for our technology and products. We seek to protect our technology by, among other things, filing patent applications for technology considered important to the development of our business. We also rely upon trade secrets, unpatented know-how, continuing technological innovation, and the aggressive pursuit of licensing opportunities to help develop and maintain our competitive position.

Our ability to compete effectively with other companies depends, in part, on our ability to maintain the proprietary nature of our technology. Although we have been awarded, have filed applications for, or have been licensed under, numerous patents in the United States and other countries, there can be no assurance concerning the degree of protection afforded by these patents or the likelihood that pending patents will be issued.

We require all of our technical, research and development, sales and marketing, and management employees and most consultants and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information developed or made known to the entity or individual during the course of the entity's or individual's relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. Substantially all of our technical, research and development, sales and marketing, and management employees have entered into agreements providing for the assignment to us of rights to inventions made by them while employed by us.

When we believe other companies are misappropriating our intellectual property rights, we vigorously enforce those rights through legal action, and we intend to continue to do so. See Item 3, "Legal Proceedings."

Although we have numerous United States and foreign patents covering certain of our products and manufacturing processes, no particular patent is considered individually material to our business.

Employees

As of December 31, 2017, we employed approximately 23,000 full time employees, of whom approximately 91% were located outside the United States. Our future success is substantially dependent on our ability to attract and retain highly qualified technical and administrative personnel. Some of our employees outside the United States are members of trade unions, and employees at one U.S. facility are represented by a trade union. Our relationship with our employees is generally good. However, no assurance can be given that, if we continue to restructure our operations and/or reduce employee hours in response to changing economic conditions, labor unrest or strikes will not occur.

Environment, Health and Safety

We have adopted an Environmental Health and Safety Corporate Policy that commits us to achieve and maintain compliance with applicable environmental laws, to promote proper management of hazardous materials for the safety of our employees and the protection of the environment, and to minimize the hazardous materials generated in the course of our operations. This policy is implemented with accountability directly to the Board of Directors. In addition, our manufacturing operations are subject to various federal, state, and local laws restricting discharge of materials into the environment.

We are involved in environmental remediation programs at various sites currently or formerly owned by us and our subsidiaries both within and outside of the U.S., in addition to involvement as a potentially responsible party ("PRP") at Superfund sites. Certain obligations as a PRP have arisen in connection with business acquisitions. The remediation programs are on-going and the ultimate cost of site cleanup is difficult to predict given the uncertainties regarding the extent of the required cleanup, the interpretation of applicable laws and regulations and alternative cleanup methods. See Item 3, "Legal Proceedings."

We are not involved in any pending or threatened proceedings that would require curtailment of our operations. We continually expend funds to ensure that our facilities comply with applicable environmental regulations. While we believe that we are in material compliance with applicable environmental laws, we cannot accurately predict future developments and do not necessarily have knowledge of all past occurrences on sites that we currently occupy. More stringent environmental regulations may be enacted in the future, and we cannot determine the modifications, if any, in our operations that any such future regulations might require, or the cost of compliance with such regulations. Moreover, the risk of environmental liability and remediation costs is inherent in the nature of our business and, therefore, there can be no assurance that material environmental costs, including remediation costs, will not arise in the future.

With each acquisition, we attempt to identify potential environmental concerns and to minimize, or obtain indemnification for, the environmental matters we may be required to address. In addition, we establish reserves for specifically identified potential environmental liabilities. We believe that the reserves we have established are adequate. Nevertheless, we have in the past and may in the future inherit certain pre-existing environmental liabilities, generally based on successor liability doctrines. Although we have never been involved in any environmental matter that has had a material adverse impact on our overall operations, there can be no assurance that in connection with any past or future acquisition we will not be obligated to address environmental matters that could have a material adverse impact on our operations.

Company Information and Website

We file annual, quarterly, and current reports, proxy statements, and other documents with the Securities and Exchange Commission ("SEC") under the Securities Exchange Act of 1934. The public may read and copy any materials that we file with the SEC at the SEC's Public Reference Room at Station Place, 100 F Street, N.E., Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. Also, the SEC maintains an Internet website that contains reports, proxy and information statements, and other information regarding issuers, including us, that file electronically with the SEC. The public can obtain any documents that we file with the SEC at http://www.sec.gov.

In addition, our company website can be found on the Internet at www.vishay.com. The website contains information about us and our operations. Copies of each of our filings with the SEC on Form 10-K, Form 10-Q, and Form 8-K, and all amendments to those reports, can be viewed and downloaded free of charge as soon as reasonably practicable after the reports and amendments are electronically filed with or furnished to the SEC. To view the reports, access ir.vishay.com and click on "SEC Filings."

The following corporate governance related documents are also available on our website:

- Corporate Governance Principles
- Code of Business Conduct and Ethics
- Code of Ethics Applicable to the Company's Chief Executive Officer, Chief Financial Officer, Principal Accounting Officer or Controller and Financial Managers
- Audit Committee Charter
- Nominating and Corporate Governance Committee Charter
- Compensation Committee Charter
- Policy on Director Attendance at Annual Meetings
- Nominating and Corporate Governance Committee Policy Regarding Qualification of Directors
- Procedures for Securityholders' Submissions of Nominating Recommendations
- Securityholder Communications with Directors and Interested Party Communication with Non-Management Directors
- Whistleblower and Ethics Hotline Procedures
- Related Party Transactions Policy

To view these documents, access ir.vishay.com and click on "Corporate Governance."

Any of the above documents can also be obtained in print by any stockholder upon request to our Investor Relations Department at the following address:

Corporate Investor Relations
Vishay Intertechnology, Inc.
63 Lancaster Avenue
Malvern, PA 19355-2143

Item 1A. RISK FACTORS

From time to time, information provided by us, including but not limited to statements in this report, or other statements made by or on our behalf, may contain "forward-looking" information within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements involve a number of risks, uncertainties, and contingencies, many of which are beyond our control, which may cause actual results, performance, or achievements to differ materially from those anticipated. Set forth below are important factors that could cause our results, performance, or achievements to differ materially from those in any forward-looking statements made by us or on our behalf. You should understand that it is not possible to predict or identify all such factors. Consequently, you should not consider the following to be a complete discussion of all potential risks or uncertainties.

Risks relating to our business generally

Our business is cyclical and future periods of decline and recovery are not predictable.

The electronic component industry is highly cyclical and experiences periods of decline from time to time. We and others in the electronic component industry have experienced these conditions in the recent past and cannot predict when we may experience such downturns in the future. Market conditions, such as a decline in product demand on a global basis, could result in order cancellations and deferrals, lower average selling prices, and a material and adverse impact on our results of operations. These declines in demand are driven by market conditions in the end markets for our products. Changes in the demand mix, needed technologies, and these end markets may adversely affect our ability to match our products, inventory, and capacity to meet customer demand and could adversely affect our operating results and financial condition. A slowdown in demand or recessionary trends in the global economy makes it more difficult for us to predict our future sales and manage our operations, and could adversely impact our results of operations.

We have incurred, and may in the future incur, restructuring costs and associated asset write-downs.

To remain competitive, particularly when business conditions are difficult, we sometimes attempt to reduce our cost structure by restructuring our existing businesses, where we seek to achieve synergies, eliminate redundant facilities and staff positions, and move operations, where possible, to jurisdictions with lower labor costs. In 2013 and 2015, we announced various cost reduction programs as part of our continuous efforts to improve efficiency and operating performance. The programs primarily focused on enhancing the competitiveness of our MOSFETs segment, reducing selling, general, and administrative expenses company-wide, and improving the performance of certain product lines within our Capacitors and Resistors & Inductors segments. In 2016, we announced an extension of the 2013 MOSFETs Enhanced Competitiveness Program. We incurred accelerated depreciation expenses related to assets that are no longer used after the implementation of the associated restructuring programs. The expenses associated with the programs were recorded as they become recognizable under GAAP. As of December 31, 2017, the programs were substantially implemented.

Additionally, our long-term strategy includes growing through the integration of acquired businesses, and GAAP requires plant closure and employee termination costs that we incur in connection with our acquisition activities to be recorded as expenses in our consolidated statement of operations, as such expenses are incurred. For this reason, we expect to have some level of future restructuring expenses due to acquisitions.

Our business is cyclical, and in periods of a rising economy we may experience intense demand for our products. If our restructuring activities result in us not being able to satisfy the intense demand from our customers during a rising economy and our competitors sufficiently expand production, we could lose customers and/or market share. These losses could have an adverse effect on our operations, financial condition, and results of operations.

In the past we have grown through successful integration of acquired businesses, but this may not continue.

Our long-term historical growth in revenues and net earnings has resulted in large part from our strategy of expansion through acquisitions. Despite our plan to continue to grow, in part, through targeted acquisitions, we may be unable to continue to identify, have the financial capabilities to acquire, or successfully complete transactions with suitable acquisition candidates. We are subject to various U.S. and foreign competition laws and regulations that may affect our ability to complete certain acquisitions. Also, if an acquired business fails to operate as anticipated, cannot be successfully integrated with our other businesses, or we cannot effectively mitigate the assumed, contingent, and unknown liabilities acquired, our results of operations, financial condition, enterprise value, market value, and prospects could all be materially adversely affected.

To remain successful, we must continue to innovate, and our investments in new technologies may not prove successful.

Our future operating results are dependent on our ability to continually develop, introduce, and market new and innovative products, to modify existing products, to respond to technological change, and to customize certain products to meet customer requirements. There are numerous risks inherent in this process, including the risks that we will be unable to anticipate the direction of technological change or that we will be unable to develop and market new products and applications in a timely fashion to satisfy customer demands. If this occurs, we could lose customers and experience adverse effects on our financial condition and results of operations.

In addition to our own research and development initiatives, we periodically invest in technology start-up enterprises, in which we may acquire a controlling or noncontrolling interest but whose technology would be available to be commercialized by us. There are numerous risks in investments of this nature including the limited operating history of such start-up entities, their need for capital, and their limited or absence of production experience, as well as the risk that their technologies may prove ineffective or fail to gain acceptance in the marketplace. Certain of our historical investments in start-up companies have not succeeded, and there can be no assurance that our current and future investments in start-up enterprises will prove successful.

Our results are sensitive to raw material availability, quality, and cost.

Many of our products require the use of raw materials that are produced in only a limited number of regions around the world or are available from only a limited number of suppliers. Our results of operations may be materially adversely affected if we have difficulty obtaining these raw materials, the quality of available raw materials deteriorates, or there are significant price increases for these raw materials. The determination that any of the raw materials used in our products are conflict minerals originating from the Democratic Republic of the Congo or adjoining countries could increase the probability that we will encounter the challenges noted above, incur additional expenses to comply with government regulations, and face public scrutiny. For periods in which the prices of these raw materials are rising, we may be unable to pass on the increased cost to our customers, which would result in decreased margins for the products in which they are used. For periods in which the prices are declining, we may be required to write down our inventory carrying cost of these raw materials, because we record our inventory at the lower of cost or market. Depending on the extent of the difference between market price and our carrying cost, this write-down could have a material adverse effect on our results of operations.

From time to time there have been short-term market shortages of certain raw materials used in our products. While these shortages have not historically adversely affected our ability to increase production of products containing these materials, they have historically resulted in higher raw material costs for us. We cannot make any assurances that any of these market shortages in the future would not adversely affect our ability to increase production, particularly during periods of growing demand for our products. To assure availability of raw materials in times of shortage, we may enter into long-term supply contracts for these materials, which may prove costly, unnecessary, and burdensome when the shortage abates.

We may not have adequate facilities to satisfy future increases in demand for our products.

Our business is cyclical and in periods of a rising economy, we may experience intense demand for our products. During such periods, we may have difficulty expanding our manufacturing to satisfy demand. Factors which could limit such expansion include delays in procurement of manufacturing equipment, shortages of skilled personnel, and physical constraints on expansion of our facilities. If we are unable to meet our customers' requirements and our competitors sufficiently expand production, we could lose customers and/or market share. These losses could have an adverse effect on our financial condition and results of operations. Also, capacity that we add during upturns in the business cycle may result in excess capacity during periods when demand for our products recede, resulting in inefficient use of capital which could also adversely affect us.

Our ability to compete effectively with other companies depends, in part, on our ability to maintain the proprietary nature of our technology.

Protection of intellectual property often involves complex legal and factual issues. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our proprietary technologies are covered by valid and enforceable patents or are effectively maintained as trade secrets. We have applied, and will continue to apply, for patents covering our technologies and products, as we deem appropriate. However, our applications may not result in issued patents. Also, our existing patents and any future patents may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products. Others may independently develop similar or alternative technologies, design around our patented technologies, or may challenge or seek to invalidate our patents. Also, the legal system in certain countries in which we operate may not provide or may not continue to provide sufficient, intellectual property legal protections and remedies.

Litigation regarding patent and other intellectual property rights is prevalent in the electronic components industry, particularly the discrete semiconductor sector. We have on occasion been notified that we may be infringing on patent and other intellectual property rights of others. In addition, customers purchasing components from us have rights to

indemnification under certain circumstances if such components violate the intellectual property rights of others. Further, we have observed that in the current business environment, electronic component and semiconductor companies have become more aggressive in asserting and defending patent claims against competitors. We will continue to vigorously defend our intellectual property rights, and may become party to disputes regarding patent licensing and cross patent licensing. Although licenses are generally offered in such situations and we have successfully resolved these situations in the past, there can be no assurance that we will not be subject to future litigation alleging intellectual property rights infringement, or that we will be able to obtain licenses on acceptable terms. An unfavorable outcome regarding one of these matters could have a material adverse effect on our business and results of operations.

We face intense competition in our business, and we market our products to an increasingly concentrated group of customers.

Our business is highly competitive worldwide, with low transportation costs and few import barriers. We compete principally on the bases of product quality and reliability, availability, customer service, technological innovation, timely delivery, and price. The electronic component industry has become increasingly concentrated and globalized in recent years and our major competitors, some of which are larger than us, have significant financial resources and technological capabilities.

Our customers have become increasingly concentrated in recent years, and as a result, their buying power has increased and they have had greater ability to negotiate favorable pricing and terms. This trend has adversely affected our average selling prices, particularly for commodity components.

Our backlog is subject to customer cancellation.

Many of the orders that comprise our backlog may be canceled by our customers without penalty. Our customers may on occasion double and triple order components from multiple sources to ensure timely delivery when demand exceeds global supply. They often cancel orders when business is weak and inventories are excessive. Therefore, we cannot be certain that the amount of our backlog accurately reflects the level of orders that we will ultimately deliver. Our results of operations could be adversely impacted if customers cancel a material portion of orders in our backlog.

Future changes in our environmental liability and compliance obligations may harm our ability to operate or increase our costs.

Our operations, products and/or product packaging are subject to environmental laws and regulations governing air emissions, wastewater discharges, the handling, disposal and remediation of hazardous substances, wastes and certain chemicals used or generated in our manufacturing processes, employee health and safety labeling or other notifications with respect to the content or other aspects of our processes, products or packaging, restrictions on the use of certain materials in or on design aspects of our products or product packaging, and responsibility for disposal of products or product packaging. We establish reserves for specifically identified potential environmental liabilities. Nevertheless, we have in the past and may in the future inherit certain pre-existing environmental liabilities, generally based on successor liability doctrines, or otherwise incur environmental liabilities. We are involved in remediation programs and related litigation at various current and former properties and at third-party disposal sites both within and outside of the U.S., including involvement as a potentially responsible party at Superfund sites. Although we have never been involved in any environmental matter that has had a material adverse impact on our overall operations, there can be no assurance that in connection with any past or future acquisition, future developments, including related to our remediation programs, or otherwise, we will not be obligated to address environmental matters that could have a material adverse impact on our results of operations. In addition, more stringent environmental regulations may be enacted in the future, and we cannot presently determine the modifications, if any, in our operations that any such future regulations might require, or the cost of compliance with these regulations. In order to resolve liabilities at various sites, we have entered into various administrative orders and consent decrees, some of which may be, under certain conditions, reopened or subject to renegotiation.

Our products are sold to or used in goods sold to the U.S. government and other governments. By virtue of such sales, we are subject to various regulatory requirements and risks in the event of non-compliance.

We sell products under prime and subprime contracts with the U.S. government and other governments. Many of these products are used in military applications. Government contractors must comply with specific procurement regulations and other requirements. These requirements, although customary in government contracts, impact our performance and compliance costs. Failure to comply with these regulations and requirements could result in contract modifications or termination, and the assessment of penalties and fines, which could negatively impact our results of operations and financial condition. Our failure to comply with these regulations and requirements could also lead to suspension or debarment, for cause, from government contracting or subcontracting for a period of time. Among the causes for debarment are violations of various statutes, including those related to procurement integrity, export control, government security regulations, employment practices, protection of the environment, accuracy of records and the recording of costs, and foreign corruption. The termination of a government contract as a result of any of these acts could have a negative impact on our results of operations and financial condition and could have a negative impact on our reputation and ability to procure other government contracts in the future.

We have qualified certain of our products under various military specifications approved and monitored by the United States Defense Electronic Supply Center and under certain European military specifications. These products are assigned certain classification levels. In order to maintain the classification level of a product, we must continuously perform tests on the products and the results of these tests must be reported to governmental agencies. If a product fails to meet the requirements of the applicable classification level, its classification may be reduced to a lower level. A decrease in the classification level for a product with a military application could have an adverse impact on the net revenues and earnings attributable to that product.

Our future success is substantially dependent on our ability to attract and retain highly qualified technical, managerial, marketing, finance, and administrative personnel.

Rapid changes in technologies, frequent new product introductions, and declining average selling prices over product life cycles require us to attract and retain highly qualified personnel to develop and manufacture products that feature technological innovations and bring them to market on a timely basis. Our complex operations also require us to attract and retain highly qualified administrative personnel in functions such as legal, tax, accounting, financial reporting, auditing, and treasury. The market for personnel with such qualifications is highly competitive. While we have employment agreements with certain of our executives, we have not entered into employment agreements with all of our key personnel.

The loss of the services of or the failure to effectively recruit qualified personnel could have a material adverse effect on our business.

Interruptions in our information technology systems could adversely affect our business.

We rely on the efficient and uninterrupted operation of complex information technology systems and networks to operate our business. Any significant system or network disruption, including, but not limited to, new system implementations, computer viruses, security breaches, facility issues or energy blackouts could have a material adverse impact on our operations and results of operations. Such network disruption could result in a loss of the confidentiality of our intellectual property or the release of sensitive competitive information or customer or employee personal data. Any loss of such information could harm our competitive position, result in a loss of customer confidence, and cause us to incur significant costs to remedy the damages caused by the disruptions or security breaches. We have implemented protective measures to prevent against and limit the effects of system or network disruptions, but there can be no assurance that such measures will be sufficient to prevent or limit the damage from any future disruptions and any such disruption could have a material adverse impact on our business and results of operations.

Third-party service providers, such as foundries, subcontractors, distributors, and vendors have access to certain portions of our sensitive data. In the event that these service providers do not properly safeguard our data that they hold, security breaches and loss of our data could result. Any such loss of data by our third-party service providers could have a material adverse impact on our business and results of operations.

Significant fluctuations in interest rates could adversely affect our results of operations and financial position.

We are exposed to changes in interest rates as a result of our borrowing activities and our cash balances. Our credit facility bears interest at variable rates based on LIBOR. A significant increase in LIBOR would significantly increase our interest expense. A general increase in interest rates would be largely offset by an increase in interest income earned on our cash and short-term investment balances, which are currently greater than our debt balances. However, there can be no assurance that the interest rate earned on cash and short-term investments will move in tandem with the interest rate paid on our variable rate debt.

Our debt levels have increased and may continue to increase, which could adversely affect the perception in the financial markets of our financial condition.

The recorded value of our outstanding debt increased from approximately $347 million as of December 31, 2008 to approximately $370 million as of December 31, 2017, primarily due to the issuance of convertible senior debentures, the proceeds from the sale of which we used to fund repurchases of our common stock. The carrying value of our convertible senior debentures will continue to increase as the discount associated with the debentures is amortized. Additionally, we and our subsidiaries may incur substantial additional debt in the future, subject to the conditions contained in our existing debt instruments, some of which may be secured debt. The marketplace could react negatively to our current debt levels which in turn could affect our share price and also make it more difficult to obtain financing in the future.

Prior to three months before the respective maturity dates of our convertible senior debentures due 2040, 2041, and 2042, the holders of the debentures may only convert the debentures under specific circumstances as defined in the indentures governing the debentures. As of December 31, 2017, our convertible senior debentures due 2040 and 2042 are convertible (See Note 6 to the Consolidated Financial Statements). Regardless of current convertibility of the debentures, GAAP requires convertible debentures to be included in the calculation of diluted EPS using either the "If Converted" or the "Treasury Stock Method" depending on our intent and ability to settle the debentures upon repurchase or conversion. The application of the "If Converted" method generally results in significantly more potentially dilutive securities compared to the "Treasury Stock Method." Pursuant to the indentures governing the respective debentures, we have the right to pay the conversion value or purchase price for the debentures in cash, Vishay common stock, or a combination of both. At the direction of our Board of Directors, we intend, upon conversion, to repay the principal amounts of the debentures and settle any additional amounts in shares of Vishay common stock. Accordingly, the debentures are included in the diluted EPS computation using the "Treasury Stock" method" rather than the "If Converted" method. If we were unable to employ the "Treasury Stock" method due to increased debt levels or changes in intentions, the number of potentially dilutive securities could increase significantly.

Our existing credit facility restricts our current and future operations and requires compliance with certain financial covenants.

Our existing credit facility includes restrictions on, among other things, incurring indebtedness, incurring liens on assets, making investments and acquisitions, making asset sales, and paying cash dividends and making other restricted payments. Our existing credit facility also requires us to comply with other covenants, including the maintenance of specific financial ratios. If we are not in compliance with all of such covenants, the credit facility could be terminated by the lenders, and all amounts outstanding pursuant to the credit facility could become immediately payable. Additionally, our convertible senior debentures due 2040, due 2041, and due 2042 have cross-default provisions that could accelerate repayment in the event the indebtedness under the credit facility is accelerated.

Future acquisitions could require us to issue additional indebtedness or equity.

If we were to undertake a substantial acquisition for cash, the acquisition would likely need to be financed in part through bank borrowings or the issuance of public or private debt. This acquisition financing would likely decrease our ratio of earnings to fixed charges and adversely affect other leverage criteria. Under our existing credit facility, we are required to obtain the lenders' consent for certain additional debt financing and to comply with other covenants including the application of specific financial ratios. We cannot make any assurances that the necessary acquisition financing would be available to us on acceptable terms if and when required. If we were to undertake an acquisition for equity, the acquisition may have a dilutive effect on the interests of the holders of our common stock.

Risks relating to Vishay's operations outside the United States

We are subject to the risks of political, economic, and military instability in countries outside the United States in which we operate.

We have substantial operations outside the United States, and approximately 77% of our revenues during 2017 were derived from sales to customers outside the United States. Certain of our assets are located, and certain of our products are produced, in countries which are subject to risks of social, political, economic, and military instability. This instability could result in wars, riots, nationalization of industry, currency fluctuation, and labor unrest. These conditions could have an adverse impact on our ability to operate in these regions and, depending on the extent and severity of these conditions, could materially and adversely affect our overall financial condition, results of operations, and our ability to access our liquidity.

Our business has been in operation in Israel for 47 years, where we have substantial manufacturing operations. Although we have never experienced any material interruption in our operations attributable to these factors, in spite of several Middle East crises, including wars, our financial condition and results of operations might be adversely affected if events were to occur in the Middle East that interfered with our operations in Israel.

Our global operations are subject to extensive anti-corruption laws and other regulations.

The U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws generally prohibit companies and their intermediaries from making improper payments or providing anything of value to improperly influence foreign government officials for the purpose of obtaining or retaining business, or obtaining an unfair advantage. Recent years have seen a substantial increase in the global enforcement of anti-corruption laws. Our continued operation and expansion outside the United States, including in developing countries, could increase the risk of such violations or violations under other regulations relating to limitations on or licenses required for sales made to customers located in certain countries. Violations of these laws may result in severe criminal or civil sanctions, could disrupt our business, and result in a material adverse effect on our reputation, business and results of operations or financial condition.

We attempt to improve profitability by controlling labor costs, but these activities could result in labor unrest or considerable expense.

Historically, our primary labor cost controlling strategy was to transfer manufacturing operations to countries with lower production costs, such as the Czech Republic, Hungary, India, Israel, Malaysia, Mexico, the People's Republic of China, and the Philippines. We believe that our manufacturing footprint is suitable to serve our customers and end markets, while maintaining lower manufacturing costs. We do not anticipate further transferring any significant existing operations to lower-labor-cost countries; however, acquired operations may be transferred to lower-labor-cost countries when integrated into Vishay. Currently, our primary labor cost controlling strategy involves reducing hours and limiting the use of subcontractors and foundries when demand for our products decreases. Shifting operations to lower-labor-cost countries, reducing hours, or limiting the use of subcontractors and foundries could result in production inefficiencies, higher costs, and/or strikes or other types of labor unrest.

We are subject to foreign currency exchange rate risks which may impact our results of operations.

We are exposed to foreign currency exchange rate risks, particularly due to market values of transactions in currencies other than the functional currencies of certain subsidiaries. From time to time, we utilize forward contracts to hedge a portion of projected cash flows from these exposures.

Our significant foreign subsidiaries are located in Germany, Israel, and Asia. We finance our operations in Europe and certain locations in Asia in local currencies. Our operations in Israel and most significant locations in Asia are largely

financed in U.S. dollars, but these subsidiaries also have significant transactions in local currencies. Our exposure to foreign currency risk is mitigated to the extent that the costs incurred and the revenues earned in a particular currency offset one another. Our exposure to foreign currency risk is more pronounced in situations where, for example, production labor costs are predominantly paid in local currencies while the sales revenue for those products is denominated in U.S. dollars. This is particularly the case for products produced in Israel, the Czech Republic, and China.

A change in the mix of the currencies in which we transact our business could have a material effect on results of operations. Furthermore, the timing of cash receipts and disbursements could have a material effect on our results of operations, particularly if there are significant changes in exchange rates in a short period of time.

Approximately 99% of our cash and cash equivalents and short-term investments balances were held by our non-U.S. subsidiaries, and our U.S. parent company and U.S. subsidiaries have significant payment obligations.

We generate a significant amount of cash and profits from our non-U.S. subsidiaries. As of December 31, 2017, $1,282.1 million of our cash and cash equivalents and short-term investments were held by subsidiaries outside of the United States.

The Tax Cuts and Jobs Act ("TCJA"), enacted on December 22, 2017, transitions the U.S. from a worldwide tax system to a territorial tax system. Under previous law, companies could indefinitely defer U.S. income taxation on unremitted foreign earnings. The TCJA imposes a one-time transition tax on deferred foreign earnings of 15.5% for liquid assets and 8% for illiquid assets, payable in defined increments over eight years. As a result of this requirement, we provisionally expect to pay $180.0 million, net of estimated applicable foreign tax credits, and after utilization of net operating loss and R&D and FTC Credit carryforwards. Based on our U.S. cash position, we expect that we will be required to repatriate amounts from our non-U.S. subsidiaries to the United States to satisfy this tax obligation.

These previously deferred foreign earnings may now be repatriated to the United States without additional U.S. federal taxation. However, any such repatriation could incur withholding and other foreign taxes in the source and intervening foreign jurisdictions, and certain U.S. state taxes.

Cash dividends to stockholders, share repurchases, and principal and interest payments on our debt instruments need to be paid by the U.S. parent company, Vishay Intertechnology, Inc. Our U.S. subsidiaries have other operating cash needs.

If we are unable to repatriate adequate cash to the United States to satisfy these obligations, it could materially and adversely affect our overall financial condition, results of operations and our liquidity.

Risks related to our capital structure

The holders of our Class B common stock have effective voting control of our company.

We have two classes of common stock: common stock and Class B common stock. The holders of common stock are entitled to one vote for each share held, while the holders of Class B common stock are entitled to 10 votes for each share held. At December 31, 2017, the holders of Class B common stock held approximately 47.9% of the voting power of Vishay. The ownership of Class B common stock is highly concentrated, and holders of Class B common stock effectively can cause the election of directors and approve other actions as stockholders. As a result of the passing of our founder and former Executive Chairman, Dr. Felix Zandman, Mrs. Ruta Zandman (a member of our Board of Directors) controls the voting of, solely or on a shared basis with Marc Zandman (our Executive Chairman) and Ziv Shoshani (a member of our Board of Directors), approximately 89.5% of our Class B common stock and 42.9% of the total voting power of our capital stock as of December 31, 2017.

We have a staggered board of directors which could make a takeover of Vishay difficult.

Along with the Class B common stock voting power, our staggered board of directors might discourage, delay, or prevent a change in control of our company by a third party and could discourage proxy contests and make it more difficult for stockholders to elect directors and take other corporate actions. Also, as a consequence of our staggered board, directors may not be removed without cause, even though a majority of stockholders may wish to do so.

Our reluctance to issue substantial additional shares in order not to dilute the interests of our existing stockholders could impede growth.

Our overall long-term business strategy has historically included a strong focus on acquisitions financed alternatively through cash on hand, the incurrence of indebtedness, and the issuance of equity, directly or indirectly by refinancing acquisition debt. We may in the future be presented with attractive investment or strategic opportunities that, because of their size and our financial condition at the time, would require the issuance of substantial additional amounts of our common stock. Some or all of our holders of Class B common stock may exert considerable influence over our policies, business and affairs, and in any corporate transaction or other matter, including those described above. If such opportunities were to arise, our Board of Directors may consider the potentially dilutive effect on the interests and voting power of our existing stockholders, including our Class B stockholders. Any resulting reluctance to issue additional shares could impede our future growth.

Our outstanding convertible debentures may impact the trading price of our common stock.

We believe that many investors in, and potential purchasers of, convertible debt instruments employ, or seek to employ, a convertible arbitrage strategy with respect to these instruments. Investors that employ a convertible arbitrage strategy with respect to convertible debt instruments typically implement that strategy by selling short the common stock underlying the convertible instrument and dynamically adjusting their short position while they hold the instrument. The implementation of this strategy by investors in our convertible debentures, as well as related market regulatory actions, could have a significant impact on the trading prices of our common stock, and the trading prices and liquidity of our convertible debentures. The price of our common stock and our convertible debentures could also be affected by possible sales of our common stock by investors who view our convertible debentures as more attractive means of equity participation in us.

Risks related to the spin-off of the Vishay Precision Group

Vishay Precision Group is using the Vishay name under license from us, which could result in product and market confusion or the loss of certain of our rights to the Vishay name.

VPG has a worldwide, perpetual and royalty-free license from us to use the "Vishay" mark as part of its corporate name and in connection with the manufacture, sale, and marketing of the products and services that comprise its measurements and foil resistors businesses. The license of the Vishay name to VPG is important because we anticipate that the success of VPG will depend in no small measure on the reputation of the Vishay brand for these products and services built over many years. Nonetheless, there exists the risk that the use by VPG could cause confusion in the marketplace over the products of the two companies, that any negative publicity associated with a product or service of VPG following the spin-off could be mistakenly attributed to our company or that we could lose our own rights to the "Vishay" mark if we fail to impose sufficient controls on VPG's use of the mark.

General Economic and Business Risks

In addition to the risks relating specifically to our business, a variety of other factors relating to general conditions could cause actual results, performance, or achievements to differ materially from those expressed in any of our forward-looking statements. These factors include:

- overall economic and business conditions;
- competitive factors in the industries in which we conduct our business;
- changes in governmental regulation;
- changes in tax requirements, including tax rate changes, new tax laws, and revised tax law interpretations;
- changes in GAAP or interpretations of GAAP by governmental agencies and self-regulatory groups;
- interest rate fluctuations, foreign currency rate fluctuations, and other capital market conditions; and
- economic and political conditions in international markets, including governmental changes and restrictions on the ability to transfer capital across borders.

Our common stock, traded on the New York Stock Exchange, has in the past experienced, and may continue to experience, significant fluctuations in price and volume. We believe that the financial performance and activities of other publicly traded companies in the electronic component industry could cause the price of our common stock to fluctuate substantially without regard to our operating performance.

We operate in a continually changing business environment, and new factors emerge from time to time. Other unknown and unpredictable factors also could have a material adverse effect on our future financial condition and results of operations.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

At December 31, 2017, our business had 48 manufacturing locations. Our manufacturing facilities include owned and leased locations. Some locations include both owned and leased facilities in the same location. The list of manufacturing facilities below excludes manufacturing facilities that are presently idle due to our restructuring activities. See Note 4 to our consolidated financial statements for further information related to our restructuring efforts, as well as additional information in "Cost Management" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

In the opinion of management, our properties and equipment generally are in good operating condition and are adequate for our present needs. Owning many of our manufacturing facilities provides us meaningful financial and operating benefits, including long-term stability and a necessary buffer for economic downturns. We do not anticipate difficulty in renewing existing leases as they expire or in finding alternative facilities.

The principal locations of our owned manufacturing facilities, along with available space including administrative offices, are as follows:

Owned Locations	Business Segment	Approx. Available Space (Square Feet)
United States		
Columbus, NE	Resistors & Inductors	158,000
Yankton, SD	Resistors & Inductors	58,000
Warwick, RI	Resistors & Inductors	55,000
Bennington, VT	Capacitors	54,000
Niagara Falls, NY	Resistors & Inductors	38,000
Marshall, MN	Resistors & Inductors	22,000
Non-U.S.		
Israel		
Dimona	Resistors & Inductors and Capacitors	404,000
Migdal Ha'Emek	Capacitors	288,000
Be'er Sheva	Resistors & Inductors and Capacitors	276,000
People's Republic of China		
Tianjin	Diodes	374,000
Shanghai	Optoelectronic Components	195,000
Xi'an	MOSFETS and Diodes	121,000
Germany		
Selb	Resistors & Inductors and Capacitors	306,000
Heide	Resistors & Inductors	161,000
Landshut	Capacitors	72,000
Fichtelberg	Resistors & Inductors	24,000
Czech Republic		
Blatna	Capacitors	191,000
Dolni Rychnov	Resistors & Inductors and Capacitors	182,000
Prachatice	Resistors & Inductors	91,000
Volary	Resistors & Inductors	35,000
Melaka, Malaysia	Optoelectronic Components	480,000
Republic of China (Taiwan)		
Taipei	Diodes	366,000

Kaohsiung	MOSFETs	63,000
France		
Nice	Resistors & Inductors	215,000
Chateau Gontier	Resistors & Inductors	84,000
Hyeres	Resistors & Inductors	65,000
Loni, India	Resistors & Inductors and Capacitors	350,000
Famalicao, Portugal	Capacitors	167,000
Miharu, Japan	Capacitors	163,000
Vocklabruck, Austria	Diodes	153,000
Manila, Philippines	Diodes and Optoelectronic Components	144,000
Turin, Italy	Diodes	127,000
Budapest, Hungary	Diodes	116,000
Juarez, Mexico	Resistors & Inductors	57,000

The principal locations of our leased manufacturing facilities, along with available space including administrative offices, are as follows:

Leased Locations	Business Segment	Approx. Available Space (Square Feet)
United States		
Ontario, CA	Resistors & Inductors	46,000
Milwaukee, WI	Resistors & Inductors	42,000
Dover, NH	Resistors & Inductors	35,000
Duluth, MN	Resistors & Inductors	10,000
Non-U.S.		
People's Republic of China		
Danshui	Capacitors	446,000
Shanghai	MOSFETS	296,000
Zhuhai	Resistors & Inductors	129,000
Klagenfurt, Austria	Capacitors	130,000
Juarez, Mexico	Resistors & Inductors	128,000
Germany		
Itzehoe	MOSFETs	207,000
Heilbronn	Diodes and Optoelectronic Components	48,000
Mumbai, India	Diodes	34,000
Santo Domingo, Dominican Republic	Resistors & Inductors	38,000
Prestice, Czech Republic	Resistors & Inductors	13,000

Item 3. LEGAL PROCEEDINGS

From time to time we are involved in routine litigation incidental to our business. Management believes that such matters, either individually or in the aggregate, should not have a material adverse effect on our business or financial condition.

Antitrust Class Action Complaints

Vishay Polytech Co., Ltd. ("VPC"), a subsidiary of Vishay which was purchased from Holy Stone Enterprises Co., Ltd. ("Holy Stone") in June 2014, is a named defendant, among other manufacturers, in purported antitrust class action complaints in the United States and Canada. The complaints allege restraints of trade in aluminum and tantalum electrolytic capacitors, and in some cases, film capacitors, and seek injunctive relief and unspecified joint and several treble damages. Vishay Intertechnology, Inc. is a party to similar cases filed in Canada.

Holy Stone has agreed to indemnify Vishay and VPC for losses, including penalties and expenses associated with the litigation and investigation described above. Notwithstanding this indemnity obligation, the Company and VPC intend to defend vigorously against the civil complaints.

Intellectual Property Matters

We are engaged in discussions with various parties regarding patent licensing and cross patent licensing issues. In addition, we have observed that in the current business environment, electronic component and semiconductor companies have become more aggressive in asserting and defending patent claims against competitors. We are a party to disputes alleging infringement of third-party patents. When we believe other companies are misappropriating our intellectual property rights, we vigorously enforce those rights through legal action, and we intend to continue to do so.

Environmental Matters

Vishay is involved in environmental remediation programs at various sites currently or formerly owned by Vishay and its subsidiaries both within and outside of the U.S., in addition to involvement as a potentially responsible party ("PRP") at Superfund sites. Certain obligations as a PRP have arisen in connection with business acquisitions. The remediation programs are on-going and the ultimate cost of site cleanup is difficult to predict given the uncertainties regarding the extent of the required cleanup, the interpretation of applicable laws and regulations, and alternative cleanup methods. See also Note 13 to our consolidated financial statements.

Item 4. MINE SAFETY DISCLOSURES

None.

EXECUTIVE OFFICERS OF THE REGISTRANT

The following table sets forth certain information regarding our executive officers as of February 16, 2018:

Name	Age	Positions Held
Marc Zandman*	56	Executive Chairman of the Board, Chief Business Development Officer, and President, Vishay Israel Ltd.
Dr. Gerald Paul*	68	Chief Executive Officer, President, and Director
Lori Lipcaman	60	Executive Vice President and Chief Financial Officer
Johan Vandoorn	60	Executive Vice President and Chief Technical Officer
David Valletta	57	Executive Vice President Worldwide Sales
Joel Smejkal	51	Executive Vice President and Business Head Passive Components
Clarence Tse	59	Executive Vice President and Business Head Semiconductors
Werner Gebhardt	59	Executive Vice President Global Human Resources

* Member of the Executive Committee of the Board of Directors.

Marc Zandman was appointed Executive Chairman of the Board and Chief Business Development Officer effective June 5, 2011. Mr. Zandman has served as a Director of Vishay since 2001 and President of Vishay Israel Ltd. since 1998. Mr. Zandman previously was Vice Chairman of the Board from 2003 to June 2011, and Chief Administration Officer from 2007 to June 2011. Mr. Zandman was Group Vice President of Vishay Measurements Group from 2002 to 2004. Mr. Zandman has served in various other capacities with Vishay since 1984. He is the son of the late Dr. Felix Zandman, Vishay's Founder. Mr. Zandman controls, on a shared basis with Ruta Zandman and Ziv Shoshani, approximately 34.0% of the total voting power of our capital stock as of December 31, 2017. He also is non-executive Chairman of Vishay Precision Group, Inc., an independent, publicly-traded company spun-off from Vishay Intertechnology in 2010.

Dr. Gerald Paul was appointed Chief Executive Officer effective January 1, 2005. Dr. Paul has served as a Director of the Company since 1993, and has been President of the Company since March 1998. Dr. Paul also was Chief Operating Officer from 1996 to 2006. Dr. Paul previously was an Executive Vice President of the Company from 1996 to 1998, and President of Vishay Electronic Components, Europe from 1994 to 1996. Dr. Paul has been Managing Director of Vishay Electronic GmbH, a subsidiary of the Company, since 1991. Dr. Paul has been employed by Vishay and a predecessor company since 1978.

Lori Lipcaman was appointed Executive Vice President and Chief Financial Officer of the Company effective September 1, 2011. Ms. Lipcaman had been appointed Executive Vice President Finance and Chief Accounting Officer in September 2008. Previously, she served as Vishay's Corporate Senior Vice President, Operations Controller, from March 1998 to September 2008. Prior to that, she served in various positions of increasing responsibility in finance and controlling since joining the Company in May 1989.

Johan Vandoorn was appointed Executive Vice President and Chief Technical Officer effective August 1, 2011. Mr. Vandoorn is responsible for Vishay's technical development and internal growth programs. Mr. Vandoorn has held various positions of increasing responsibility since Vishay's acquisition of BCcomponents Holdings BV ("BCcomponents") in 2002, including Executive Vice President – Passive Components (2006 – 2012). Mr. Vandoorn had been Vice President – Global Operations of BCcomponents from 2000 until its acquisition by Vishay, and previously worked for Philips Components ("Philips") from 1980 until Philips sold the BCcomponents business to a private equity firm in 1998.

David Valletta serves as Vishay's Executive Vice President – Worldwide Sales, a position he has held since 2007. Mr. Valletta has held various positions of increasing responsibility since Vishay's acquisition of Vitramon in 1994. Prior to joining Vitramon, Mr. Valletta also worked for AVX Corporation. His experience with Vishay includes various positions within the Americas region in direct and distribution sales management and global sales responsibility for the Company's key strategic customers.

Joel Smejkal was appointed Executive Vice President and Business Head Passive Components effective January 1, 2017. Mr. Smejkal has held various positions of increasing responsibility since joining Vishay in 1990 including Senior Vice President Global Distribution Sales (2012 - 2016). Mr. Smejkal's experience with Vishay includes worldwide and divisional leadership roles in engineering, marketing, operations and sales. He was a product developer of 18 U.S. Patents for the Power Metal Strip® resistor technology and brings significant business development, marketing and sales experience.

Clarence Tse was appointed Executive Vice President and Business Head Semiconductors effective January 1, 2017. Mr. Tse has held various positions of increasing responsibility since Vishay's acquisition of Siliconix/Telefunken in 1998, including Senior Vice President, Diodes Division (2008 - 2016), Senior Vice President, Power Diodes Division (2002 - 2008) and Vice President, Finance and Administration Asia (1998 - 2001). Mr. Tse was first hired by Siliconix in 1985.

Werner Gebhardt was appointed Executive Vice President Global Human Resources effective January 1, 2017. Mr. Gebhardt has held various positions of increasing responsibility since Vishay's acquisition of Draloric Electronic GmbH ("Draloric") in 1987, including Sr. Vice President Global Human Resources (2011 - 2014) and Administrative President Europe (2006 - 2011). Mr. Gebhardt's experience with Vishay includes leadership roles in Administration and Human Resources. Mr. Gebhardt had been employed by Draloric since 1975.

PART II

Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is listed on the New York Stock Exchange under the symbol VSH. The following table sets forth the high and low sales prices for our common stock as reported on the New York Stock Exchange composite tape for the indicated fiscal quarters. Holders of record of our common stock totaled approximately 1,000 at February 14, 2018. Because many of the shares of our common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial owners represented by these stockholders of record.

In 2014, the Company's Board of Directors instituted a quarterly cash dividend program and declared the first cash dividend in the history of Vishay. Cash dividends of $0.0625 per share of common stock and Class B common stock were paid in each fiscal quarter of 2016 and the first three fiscal quarters of 2017. Cash dividends of $0.0675 per share of common stock and Class B common stock were paid in the fourth fiscal quarter of 2017. We expect to continue to pay quarterly dividends, although the amount and timing of any future dividends remains subject to authorization of our Board of Directors.

The following table sets forth, for the indicated periods, the high and low sales prices of our common stock and the quarterly cash dividends declared.

	Common stock price range				Dividends declared per share	
	2017		2016			
	High	Low	High	Low	2017	2016
Fourth quarter	$23.45	$18.75	$16.75	$13.66	$0.0675	$0.0625
Third quarter	$18.85	$16.45	$14.28	$11.68	$0.0625	$0.0625
Second quarter	$17.60	$15.40	$13.51	$11.53	$0.0625	$0.0625
First quarter	$17.00	$15.35	$12.78	$9.96	$0.0625	$0.0625

At February 14, 2018, we had outstanding 12,097,427 shares of Class B common stock, par value $.10 per share, each of which entitles the holder to ten votes. The Class B common stock generally is not transferable except in certain very limited instances, and there is no market for those shares. The Class B common stock is convertible, at the option of the holder, into common stock on a share for share basis. As a result of the passing of our founder and former Executive Chairman, Dr. Felix Zandman, Mrs. Ruta Zandman (a member of our Board of Directors) controls the voting of, solely or on a shared basis with Marc Zandman (our Executive Chairman) and Ziv Shoshani (a member of our Board of Directors) approximately 89.7% of our Class B common stock and 43.0% of the total voting power of our capital stock.

Certain of our debt obligations contain restrictions as to the payment of cash dividends. See "Financial Condition, Liquidity, and Capital Resources" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

On August 2, 2017, our Board of Directors approved a stock repurchase plan, authorizing us to repurchase, in the aggregate, up to $150 million of our outstanding common stock. The stock repurchase plan will expire on June 1, 2018. The stock repurchase plan does not obligate us to acquire any particular amount of common stock, and it may be terminated or suspended at our direction in accordance with the plan. The following table provides information about repurchases of the Company's common stock during the three-month period ended December 31, 2017:

Period	Total Number of Shares Purchased	Average Price Paid per Share (including commission)	Total Number of Shares Purchased as Part of Publicly Announced Program	Total Dollar Amount Purchased Under the Program	Maximum Dollar Value of Shares that May Yet Be Purchased Under the Program
October 1 - October 28	123,053	$ 19.34	123,053	$2,380,328	$110,055,873
October 29 - November 25	-	$ -	-	$-	$110,055,873
November 26 - December 31	-	$ -	-	$-	$110,055,873
Total	123,053	$ 19.34	123,053	$2,380,328	$110,055,873

Stock Performance Graph

The line graph below compares the cumulative total stockholder return on Vishay's common stock over a 5-year period with the returns on the Standard & Poor's MidCap 400 Stock Index (of which Vishay is a component), the Standard & Poor's 500 Stock Index, and the Philadelphia Semiconductor Index. The line graph assumes that $100 had been invested at December 31, 2012 and assumes that all dividends were reinvested.

	Base Period	Years Ending December 31,				
Company Name / Index	2012	2013	2014	2015	2016	2017
Vishay Intertechnology, Inc.	100	124.74	135.28	117.59	161.02	209.18
S&P 500 Index	100	132.39	150.51	152.59	170.84	208.14
S&P MidCap 400 Index	100	133.50	146.54	143.35	173.08	201.20
Philadelphia Semiconductor Index	100	141.84	185.26	182.31	254.00	356.98

Item 6. SELECTED FINANCIAL DATA

The following table sets forth selected consolidated financial information as of and for the fiscal years ended December 31, 2017, 2016, 2015, 2014, and 2013. This table should be read in conjunction with our consolidated financial statements and the related notes thereto included elsewhere in this Form 10-K (in thousands, except per share amounts):

	As of and for the years ended December 31,				
	2017 (1)	2016 (2)	2015 (3)	2014 (4)	2013 (5)
Statement of Operations Data:					
Net revenues	$2,603,522	$2,323,431	$2,300,488	$2,493,282	$2,370,979
Costs of products sold	1,903,910	1,753,648	1,758,268	1,881,990	1,803,719
Gross profit	699,612	569,783	542,220	611,292	567,260
Selling, general, and administrative expenses	376,751	367,987	362,226	385,696	368,542
Restructuring and severance costs	11,273	19,199	19,215	20,897	2,814
Impairment of intangible assets	-	1,559	57,600	-	-
Impairment of goodwill	-	-	5,380	-	-
U.S. pension settlement charges	-	79,321	-	15,588	-
Executive compensation charges (credit)	-	-	-	-	(1,778)
Operating income	311,588	101,717	97,799	189,111	197,682
Other income (expense)					
Interest expense	(27,850)	(25,623)	(25,685)	(24,457)	(23,130)
Other	1,738	4,716	7,976	2,489	1,853
Loss on disposal of equity affiliate	(6,112)	-	-	-	-
Gain on early extinguishment of debt	-	4,597	-	-	-
Gain (loss) related to Tianjin explosion	-	8,809	(5,350)	-	-
Total other income (expense)	(32,224)	(7,501)	(23,059)	(21,968)	(21,277)
Income before taxes and noncontrolling interest	279,364	94,216	74,740	167,143	176,405
Income taxes	298,924	44,843	182,473	49,300	52,636
Net earnings (loss)	(19,560)	49,373	(107,733)	117,843	123,769
Noncontrolling interest	784	581	781	214	789
Net earnings (loss) attributable to Vishay stockholders	$(20,344)	$48,792	$(108,514)	$117,629	$122,980
Basic earnings (loss) per share attributable to Vishay stockholders:	$(0.14)	$0.33	$(0.73)	$0.80	$0.85
Diluted earnings (loss) per share attributable to Vishay stockholders:	$(0.14)	$0.32	$(0.73)	$0.77	$0.81
Weighted average shares outstanding – basic	145,633	147,152	147,700	147,567	144,963
Weighted average shares outstanding – diluted	145,633	150,697	147,700	153,716	151,417
Cash dividends per share	$0.255	$0.250	$0.240	$0.240	$-
Balance Sheet Data:					

Total assets	$3,459,189	$3,077,801	$3,152,986	$3,274,151	$3,224,455
Long-term debt, less current portion	370,470	357,023	436,738	444,055	352,227
Working capital	1,627,955	1,407,622	1,429,768	1,461,686	1,510,032
Total Vishay stockholders' equity	1,428,157	1,565,517	1,622,476	1,825,366	1,872,756

(1) Includes $11,273,000 of restructuring and severance costs, $6,112,000 of loss on disposal of an equity affiliate, $234,855,000 net tax expense related to the enactment of the Tax Cuts and Jobs Act in the United States, $1,565,000 tax expense due to the effects of changes in uncertain tax positions, and $5,802,000 tax benefit related to our previous repatriation of foreign earnings to the United States plan. These items, net of their tax consequences, had a negative $1.57 effect on earnings (loss) per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(2) Includes $19,199,000 of restructuring and severance costs, $79,321,000 of non-cash pension settlement charges, $1,559,000 of intangible asset impairment charges, a $4,597,000 gain on early extinguishment of debt, a $8,809,000 gain on the settlement of insurance claims related to the Tianjin explosion, $34,853,000 tax expense from accumulated other comprehensive income as a result of the pension settlement, $8,704,000 tax benefit due to the effects of changes in uncertain tax positions, and $3,553,000 tax benefit related to the planned repatriation of foreign earnings to the United States. These items, net of their tax consequences, had a negative $0.53 effect on earnings per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(3) Includes $19,215,000 of restructuring and severance costs, $57,600,000 of intangible asset impairment charges, $5,380,000 of goodwill impairment charges, a loss of $5,350,000 related to the Tianjin explosion, a $163,954,000 tax expense related to the planned repatriation of foreign earnings to the United States, a $8,888,000 tax benefit due to the effects of changes in valuation allowances, and a $2,629,000 tax benefit due to the effects of changes in uncertain tax positions. These items, net of their tax consequences, had a negative $1.45 effect on earnings (loss) per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(4) Includes the results of Holy Stone Polytech, from June 11, 2014, and the results of Capella from September 1, 2014, including the noncontrolling interest for the period before full control was obtained. Also includes $20,897,000 of restructuring and severance costs, $15,588,000 of U.S. pension plan non-cash settlement charges, a $25,706,000 tax expense related to a planned repatriation of foreign earnings to the United States, a $25,706,000 tax benefit due to the effects of changes in uncertain tax positions, and a $1,228,000 one-time tax benefit related to tax law changes. These items, net of their tax consequences, had a negative $0.15 effect on earnings per share attributable to Vishay stockholders.

(5) Includes the results of MCB Industrie, from June 13, 2013. Also includes a net pretax reversal of stock-based compensation expense recognized for the performance-based RSUs scheduled to vest on January 1, 2014, which were originally reported as a separate line item upon the cessation of employment of certain former executive officers in 2011 of $1,778,000, a $2,867,000 one-time tax benefit due to a new law enacted in Israel in July 2013 which effectively increases the corporate income tax rate on certain types of income earned after January 1, 2014, and, therefore, increases our deferred tax assets, and a $1,330,000 one-time tax benefit due to the retroactive enactment of the American Taxpayer Relief Act of 2012 that was signed into law on January 2, 2013, partially offset by $2,814,000 of restructuring and severance costs. These items, net of their related tax consequences, had a positive $0.02 effect on earnings per share attributable to Vishay stockholders.

Management believes that stating the impact on net earnings of items such as goodwill and intangible assets impairment charges, restructuring and severance costs, material pension settlement charges, executive compensation charges (credits), material gains and losses on sales of property, special tax items, and other items is meaningful to investors because it provides insight with respect to intrinsic operating results of the Company.

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Overview

Vishay Intertechnology, Inc. is a global manufacturer and supplier of semiconductors and passive components, including power MOSFETs, power integrated circuits, transistors, diodes, optoelectronic components, resistors, capacitors, and inductors. Discrete semiconductors and passive components manufactured by Vishay are used in virtually all types of electronic products, including those in the industrial, computing, automotive, consumer electronic products, telecommunications, power supplies, military/aerospace, and medical industries.

We operate in five product segments, MOSFETs, Diodes, Optoelectronic Components, Resistors & Inductors, and Capacitors.

Since 1985, we have pursued a business strategy of growth through focused research and development and acquisitions. Through this strategy, we have grown to become one of the world's largest manufacturers of discrete semiconductors and passive components. We expect to continue our strategy of acquisitions while also maintaining a prudent capital structure.

We are focused on enhancing stockholder value and improving earnings per share. In addition to our growth plan, we also have opportunistically repurchased our stock. In 2014, our Board of Directors instituted a quarterly dividend payment program and declared the first cash dividend in the history of Vishay. In December 2015, we amended our credit facility to increase our ability to repurchase shares of stock or pay cash dividends. On August 2, 2017, our Board of Directors approved a stock repurchase plan, authorizing us to repurchase, in the aggregate, up to $150 million of our outstanding common stock. The stock repurchase plan will expire on June 1, 2018. The stock repurchase plan does not obligate us to acquire any particular amount of common stock, and it may be terminated or suspended at any time at the Company's direction in accordance with the plan. The Company repurchased 2,250,236 shares of stock for $39.9 million since the inception of this plan. Additionally, we repurchased 1,752,454 shares of stock for $23.2 million pursuant to our stock repurchase plan that began in May 2016 and expired on May 2, 2017.

As part of the amendment and restatement of the revolving credit facility in December 2015, we completed an evaluation of our anticipated domestic cash needs over the next several years and our most efficient use of liquidity, with consideration of the amount of cash that can be repatriated to the U.S. efficiently with lesser withholding taxes in foreign jurisdictions. As a result of that evaluation, during the fourth quarter of 2015, we recognized income tax expense of $164.0 million, including U.S. federal and state income taxes, incremental foreign income taxes, and withholding taxes payable to foreign jurisdictions, on $300 million of foreign earnings which we expect to repatriate to the U.S. over the next several years. We repatriated $38 million and $46 million to the U.S. pursuant to this plan in 2017 and 2016, respectively. This 2015 repatriation program was expected to occur over a multiple-year period in the most tax-efficient manner, considering U.S. tax laws and the impact of withholding taxes in foreign jurisdictions, and was designed to be adaptable to the extent necessary or prudent, based on changes in law, tax rates, or other regulations. As a result of the Tax Cuts and Jobs Act ("TCJA"), and as further described below, we have terminated the 2015 cash repatriation plan and replaced it as described below.

Our business and operating results have been and will continue to be impacted by worldwide economic conditions. Our revenues are dependent on end markets that are impacted by consumer and industrial demand, and our operating results can be adversely affected by reduced demand in those global markets. For several years, we implemented aggressive cost reduction programs. We continue to monitor the current economic environment and its potential effects on our customers and the end markets that we serve. Additionally, we continue to closely monitor our costs, inventory, and capital resources to respond to changing conditions and to ensure we have the management, business processes, and resources to meet our future needs. In the first fiscal quarter of 2016, we substantially completed the

implementation of targeted cost reduction programs that began in the fourth fiscal quarter of 2013. In the fourth fiscal quarter of 2017, we substantially completed the cost reduction programs initiated in 2015 and the extended MOSFETs Enhanced Competitiveness Program, which we announced in November 2016. Our cost reduction programs are more fully described in Note 4 to the consolidated financial statements and in "Cost Management" below. See additional information regarding our competitive strengths and key challenges as disclosed in Part 1.

The TCJA represents the first significant change in U.S. tax law in over 30 years. As permitted by SEC Staff Accounting Bulletin No. 118, the net tax expense recorded in our financial statements for the fourth fiscal quarter of 2017 due to the enactment of the TCJA is considered "provisional," based on reasonable estimates. The net tax expense recorded was $234.9 million. We are continuing to collect and analyze detailed information that could impact this amount, and may record adjustments to refine those estimates during the measurement period defined in SAB No. 118, as additional analysis is completed.

We recorded noncash intangible asset impairment charges of $1.6 million and $57.6 million in 2016 and 2015, respectively, and a noncash goodwill impairment charge of $5.4 million in 2015. The goodwill and intangible assets impairment tests are more fully described in Note 3 to the consolidated financial statements.

On August 12, 2015, a major explosion occurred in the port of Tianjin, China. We own and operate a diodes manufacturing facility in Tianjin near the port. The shockwave of the explosion resulted in some damage to the facility and caused a temporary shutdown. As more fully described in Note 8 to the consolidated financial statements, we recorded a loss of $5.4 million related to this incident in 2015. The temporary shutdown adversely impacted revenues and margins of our Diodes segment (and total Vishay) for the year ended December 31, 2015. We received insurance payments totaling $13.4 million and recognized a gain of $8.8 million related to this incident and the insurance proceeds received in 2016.

In December 2016, we completed the termination and settlement of our qualified U.S. pension plan. The settlement resulted in a non-cash pre-tax charge of $79.3 million to recognize the unrecognized actuarial items related to the pension plan recorded in accumulated other comprehensive income. The pension plan termination and settlement is more fully described in Note 11 to the consolidated financial statements.

We utilize several financial metrics, including net revenues, gross profit margin, segment operating income, end-of-period backlog, book-to-bill ratio, inventory turnover, change in average selling prices, net cash and short-term investments (debt), and free cash generation to evaluate the performance and assess the future direction of our business. (See further discussion in "Financial Metrics" and "Financial Condition, Liquidity, and Capital Resources.") We experienced a continued high level of demand in virtually all end-markets in the fourth fiscal quarter of 2017. Net revenues decreased slightly versus the prior fiscal quarter, but remained significantly higher than the prior year quarter. Net revenues for 2017 increased significantly versus 2016. The strong order levels of 2017 continued in the fourth fiscal quarter and resulted in continued strong metrics and an increase in nearly all key financial metrics compared to the prior year quarter.

Net revenues for the year ended December 31, 2017 were $2.604 billion, compared to net revenues of $2.323 billion and $2.300 billion for the years ended December 31, 2016 and 2015, respectively. Net loss attributable to Vishay stockholders for the year ended December 31, 2017 was $20.3 million, or $0.14 per share, compared to net earnings attributable to Vishay stockholders of $48.8 million, or $0.32 per diluted share for the year ended December 31, 2016, and net loss attributable to Vishay stockholders of $108.5 million, or $0.73 per share, for the year ended December 31, 2015.

We define adjusted net earnings as net earnings determined in accordance with GAAP adjusted for various items that management believes are not indicative of the intrinsic operating performance of our business. We define free cash as the cash flows generated from continuing operations less capital expenditures plus net proceeds from the sale of property and equipment. The reconciliations below include certain financial measures which are not recognized in accordance with GAAP, including adjusted net earnings, adjusted earnings per share, and free cash. These non-GAAP measures should not be viewed as alternatives to GAAP measures of performance or liquidity. Non-GAAP measures such as adjusted net earnings, adjusted earnings per share, and free cash do not have uniform definitions. These measures, as calculated by Vishay, may not be comparable to similarly titled measures used by other companies. Management believes that adjusted net earnings and adjusted earnings per share are meaningful because they provide insight with respect to our intrinsic operating results. Management believes that free cash is a meaningful measure of our ability to fund acquisitions, repay debt, and otherwise enhance stockholder value through stock repurchases or dividends.

Net earnings (loss) attributable to Vishay stockholders for the years ended December 31, 2017, 2016, and 2015 include items affecting comparability. The items affecting comparability are (in thousands, except per share amounts):

	Years ended December 31,		
	2017	2016	2015
GAAP net earnings (loss) attributable to Vishay stockholders	$(20,344)	$48,792	$(108,514)
Reconciling items affecting operating margin:			
Restructuring and severance costs	$11,273	$19,199	$19,215
Impairment of intangible assets	-	1,559	57,600
Impairment of goodwill	-	-	5,380
U.S. pension settlement charges	-	79,321	-
Reconciling items affecting other income (expense):			
Loss on disposal of equity affiliate	$6,112	$-	$-
Gain on early extinguishment of debt	-	(4,597)	-
Loss (gain) related to Tianjin explosion	-	(8,809)	5,350

Reconciling items affecting tax expense (benefit):			
Enactment of TCJA	$234,855	$-	$-
Effects of cash repatriation program	(5,802)	(3,553)	163,954
Additional tax expense from AOCI - pension plans	-	34,853	-
Effects of changes in valuation allowances	-	-	(8,888)
Effects of changes in uncertain tax positions	1,565	(8,704)	(2,629)
Tax effects of pre-tax items above	(3,331)	(29,901)	(22,468)
Adjusted net earnings	$224,328	$128,160	$109,000
Adjusted weighted average diluted shares outstanding	157,010	150,697	151,329
Adjusted earnings per diluted share *	$1.43	$0.85	$0.72

* Includes add-back of interest on exchangeable notes in periods where the notes are dilutive.

Although the term "free cash" is not defined in GAAP, each of the elements used to calculate free cash is presented as a line item on the face of our consolidated statement of cash flows prepared in accordance with GAAP.

	Years ended December 31,		
	2017	2016**	2015**
Net cash provided by continuing operating activities	$368,777	$296,509	$245,991
Proceeds from sale of property and equipment	1,685	5,701	2,049
Less: Capital expenditures	(170,432)	(134,635)	(147,142)
Free cash	$200,030	$167,575	$100,898

** Results have been recast due to the adoption of ASU 2016-09. See Note 1 to the consolidated financial statements.

Our results for 2016 and 2017 represent the effects of an excellent business environment, a high level of orders, our cost reduction programs, and our organic growth initiatives. Order activity was already strong in 2016, but we experienced a relatively sharp upturn in demand in the first half of 2017 that continued through the second half of the year. Our percentage of euro-based sales approximates our percentage of euro-based expenses so the foreign currency impact on revenues was substantially offset by the impact on expenses. Our pre-tax results were consistent with expectations based on our business model.

Financial Metrics

We utilize several financial metrics to evaluate the performance and assess the future direction of our business. These key financial measures and metrics include net revenues, gross profit margin, operating margin, segment operating income, end-of-period backlog, and the book-to-bill ratio. We also monitor changes in our inventory turnover and our or publicly available average selling prices ("ASP").

Gross profit margin is computed as gross profit as a percentage of net revenues. Gross profit is generally net revenues less costs of products sold, but also deducts certain other period costs, particularly losses on purchase commitments and inventory write-downs. Losses on purchase commitments and inventory write-downs have the impact of reducing gross profit margin in the period of the charge, but result in improved gross profit margins in subsequent periods by reducing costs of products sold as inventory is used. Gross profit margin is clearly a function of net revenues, but also reflects our cost management programs and our ability to contain fixed costs.

Operating margin is computed as gross profit less operating expenses as a percentage of net revenues. We evaluate business segment performance on segment operating margin. Only dedicated, direct selling, general, and administrative expenses of the segments are included in the calculation of segment operating income. Segment operating margin is computed as operating income less items such as restructuring and severance costs, asset write-downs, goodwill and indefinite-lived intangible asset impairments, inventory write-downs, gain or losses on purchase commitments, global operations, sales and marketing, information systems, finance and administrative groups, and other items, expressed as a percentage of net revenues. We believe that evaluating segment performance excluding such items is meaningful because it provides insight with respect to intrinsic operating results of the segment. Operating margin is clearly a function of net revenues, but also reflects our cost management programs and our ability to contain fixed costs.

End-of-period backlog is one indicator of future revenues. We include in our backlog only open orders that we expect to ship in the next twelve months. If demand falls below customers' forecasts, or if customers do not control their inventory effectively, they may cancel or reschedule the shipments that are included in our backlog, in many instances without the payment of any penalty. Therefore, the backlog is not necessarily indicative of the results to be expected for future periods.

An important indicator of demand in our industry is the book-to-bill ratio, which is the ratio of the amount of product ordered during a period as compared with the product that we ship during that period. A book-to-bill ratio that is greater than one indicates that our backlog is building and that we are likely to see increasing revenues in future periods. Conversely, a book-to-bill ratio that is less than one is an indicator of declining demand and may foretell declining revenues.

We focus on our inventory turnover as a measure of how well we are managing our inventory. We define inventory turnover for a financial reporting period as our costs of products sold for the four fiscal quarters ending on the last day of the reporting period divided by our average inventory (computed using each fiscal quarter-end balance) for this same period. A higher level of inventory turnover reflects more efficient use of our capital.

Pricing in our industry can be volatile. Using our and publicly available data, we analyze trends and changes in average selling prices to evaluate likely future pricing. The erosion of average selling prices of established products is typical for semiconductor products. We attempt to offset this deterioration with ongoing cost reduction activities and new product introductions. Our specialty passive components are more resistant to average selling price erosion. All pricing is subject to governing market conditions.

The quarter-to-quarter trends in these financial metrics can also be an important indicator of the likely direction of our business. The following table shows net revenues, gross profit margin, operating margin, end-of-period backlog, book-to-bill ratio, inventory turnover, and changes in ASP for our business as a whole during the five fiscal quarters beginning with the fourth fiscal quarter of 2016 through the fourth fiscal quarter of 2017 (dollars in thousands):

	4th Quarter 2016	1st Quarter 2017	2nd Quarter 2017	3rd Quarter 2017	4th Quarter 2017
Net revenues	$570,819	$606,258	$644,892	$677,883	$674,489
Gross profit margin	23.2 %	26.5 %	26.8 %	27.9 %	26.2 %
Operating margin [1]	-8.0 %	10.7 %	12.7 %	13.6 %	10.8 %
End-of-period backlog	$653,400	$836,500	$1,034,000	$1,122,200	$1,320,200
Book-to-bill ratio	1.11	1.29	1.27	1.11	1.28
Inventory turnover	4.40	4.50	4.60	4.50	4.50
Change in ASP vs. prior quarter	-1.2 %	-1.3 %	-0.7 %	-0.1 %	-0.2 %

(1) Operating margin for the fourth fiscal quarter of 2016 and the first, second, third, and fourth fiscal quarters of 2017 includes $7.1 million, $1.5 million, $0.5 million, $3.2 million and $6.1 million, respectively, of restructuring and severance expenses (see Note 4 to our consolidated financial statements). Operating margin for the fourth fiscal quarter of 2016 includes $79.3 million of pension settlement charges (see Note 11 to our consolidated financial statements).

See "Financial Metrics by Segment" below for net revenues, book-to-bill ratio, and gross profit margin broken out by segment.

Revenues for the fourth fiscal quarter of 2017 decreased slightly versus the third fiscal quarter of 2017, but increased significantly versus the prior year quarter. The continued strong demand further increased the backlog and the book-to-bill ratio. Distributors continue to drive the high order rate. We keep increasing manufacturing capacities and output of our key product lines, but the high order rates have increased product delivery leadtimes and even caused some shortages of supply. Many of our product lines are operating at or near capacity. Sequentially, average selling prices were virtually stable, reflective of the strong business environment.

Gross profit margin decreased versus the prior fiscal quarter, but increased versus the fourth fiscal quarter of 2016. The fluctuations are primarily volume-driven with decreasing average selling prices burdening each period.

The book-to-bill ratio increased to 1.28 in the fourth fiscal quarter of 2017 from 1.11 in the third fiscal quarter of 2017. The book-to-bill ratios for distributors and original equipment manufacturers ("OEM") were 1.40 and 1.13, respectively, versus ratios of 1.15 and 1.06, respectively, during the third fiscal quarter of 2017.

Financial Metrics by Segment

The following table shows net revenues, book-to-bill ratio, gross profit margin, and segment operating margin broken out by segment for the five fiscal quarters beginning with the fourth fiscal quarter of 2016 through the fourth fiscal quarter of 2017 (dollars in thousands):

	4th Quarter 2016	1st Quarter 2017	2nd Quarter 2017	3rd Quarter 2017	4th Quarter 2017
MOSFETs					
Net revenues	$101,497	$105,529	$114,035	$126,522	$122,208
Book-to-bill ratio	1.14	1.37	1.37	1.19	1.59
Gross profit margin	17.0 %	19.6 %	22.2 %	25.5 %	25.5 %
Segment operating margin	9.4 %	11.1 %	14.6 %	18.5 %	18.2 %
Diodes					
Net revenues	$135,291	$144,895	$155,717	$160,711	$159,565
Book-to-bill ratio	1.22	1.44	1.41	1.18	1.34
Gross profit margin	21.1 %	25.9 %	26.4 %	26.7 %	25.7 %
Segment operating margin	17.7 %	22.6 %	23.2 %	23.6 %	22.5 %
Optoelectronic Components					
Net revenues	$68,491	$65,682	$73,838	$76,740	$70,089
Book-to-bill ratio	0.99	1.16	1.11	0.94	1.21
Gross profit margin	32.1 %	34.0 %	34.5 %	37.7 %	29.6 %
Segment operating margin	25.9 %	25.8 %	29.1 %	32.6 %	23.2 %
Resistors & Inductors					
Net revenues	$185,503	$200,383	$209,182	$217,601	$216,893
Book-to-bill ratio	1.08	1.22	1.23	1.15	1.19
Gross profit margin	27.5 %	30.5 %	29.7 %	30.1 %	29.0 %
Segment operating margin	23.7 %	26.9 %	26.1 %	26.8 %	25.7 %
Capacitors					
Net revenues	$80,037	$89,769	$92,120	$96,309	$105,734
Book-to-bill ratio	1.03	1.25	1.14	0.97	1.08

Gross profit margin	17.1	%	21.4	%	20.6	%	20.3	%	19.5	%
Segment operating margin	11.5	%	15.8	%	15.3	%	15.3	%	14.6	%

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U.S. Tax Reform: Tax Cuts and Jobs Act

On December 22, 2017, the Tax Cuts and Jobs Act (the "TCJA") was enacted in the United States. The TCJA represents sweeping changes in U.S. tax law. Among the numerous changes in tax law, the TCJA permanently reduces the U.S. corporate income tax rate to 21% beginning in 2018; imposes a one-time transition tax on deferred foreign earnings; establishes a participation exemption system by allowing a 100% dividends received deduction on qualifying dividends paid by foreign subsidiaries; limits deductions for net interest expense; and expands the US taxation of foreign earned income to include "global intangible low-taxed income."

Under U.S. GAAP (specifically, ASC Topic 740), the effects of changes in tax rates and laws on deferred tax balances are recognized in the period in which the new legislation is enacted. The total effect of tax law changes on deferred tax balances is recorded as a component of income tax expense.

In response to the TCJA, the Staff of the U.S. Securities and Exchange Commission issued Staff Accounting Bulletin No. 118 ("SAB No. 118") to provide guidance to registrants in applying ASC Topic 740 in connection with the TCJA. SAB No. 118 provides that in the period of enactment, the income tax effects of the TCJA may be reported as a provisional amount based on a reasonable estimate (to the extent a reasonable estimate can be determined), which would be subject to adjustment during a "measurement period". The measurement period begins in the reporting period of the TCJA's enactment and ends when a registrant has obtained, prepared, and analyzed the information that was needed in order to complete the accounting requirements under ASC Topic 740. SAB No. 118 also describes supplemental disclosures that should accompany the provisional amounts.

The TCJA represents the first significant change in U.S. tax law in over 30 years. As permitted by SAB No. 118, the net tax expense recorded in our financial statements for the fourth fiscal quarter of 2017 due to the enactment of the TCJA is considered "provisional," based on reasonable estimates. We are continuing to collect and analyze detailed information about the earnings and profits of our non-U.S. subsidiaries, the related taxes paid, the amounts which could be repatriated, the foreign taxes which may be incurred on repatriation, and the associated impact of these items under the TCJA. We may record adjustments to refine those estimates during the measurement period, as additional analysis is completed. Furthermore, we are continuing to evaluate the TCJA's provisions and may prospectively adjust our financial structure and business practices accordingly.

The provisional amount of net tax expense recorded in the fourth fiscal quarter of 2017 that is directly and indirectly related to the TCJA is summarized as follows (amounts in thousands):

Remeasurement of net deferred tax liabilities	$(74,816)
Transition tax on unremitted foreign earnings	