UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 26, 2020

Or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission file number: 000-50307

FormFactor, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**13-3711155**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

7005 Southfront Road, Livermore, California 94551

(Address of principal executive offices, including zip code)

(925) 290-4000

(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common stock, $0.001 par value	**FORM**	**Nasdaq Global Market**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ 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 ☒

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 ☒ No ☐

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

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

Large accelerated filer ☒ 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 check mark whether the registrant has filed a report on and attestation to its management’s assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepares or issued its audit report. ☒

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

Aggregate market value of registrant's common stock held by non-affiliates of the registrant, based upon the closing price of a share of the registrant's common stock on June 26, 2020 (the last business day of the registrant's most recently completed second quarter) as reported by Nasdaq Global Market on that date: $1,046.0 million.

The number of shares of the registrant's common stock, par value $0.001 per share, outstanding as of February 16, 2021 was 77,749,914 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the 2021 Annual Meeting of Stockholders, which will be filed within 120 days of the end of the registrant's fiscal year ended December 26, 2020, are incorporated by reference in Part III hereof. Except with respect to information specifically incorporated by reference in this Annual Report on Form 10-K, the Proxy Statement is not deemed to be filed as a part of this Annual Report on Form 10-K.

FORMFACTOR, INC.

Form 10-K for the Fiscal Year Ended December 26, 2020

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Throughout this Annual Report on Form 10-K, we refer to FormFactor, Inc. and its consolidated subsidiaries as "the Company," "FormFactor," "we," "us," and "our." Our fiscal year ends on the last Saturday in December. Our last three fiscal years ended on December 26, 2020, December 28, 2019 and December 29, 2018.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Securities Exchange Act of 1934 and the Securities Act of 1933, which are subject to known and unknown risks and uncertainties. The forward-looking statements include statements concerning, among other things, our business strategy (including the influence of anticipated trends and developments in our business and the markets in which we operate), financial results, operating results, revenues, gross margin, liquidity, operating expenses, products, projected costs and capital expenditures, research and development programs, sales and marketing initiatives, competition and impact of accounting standards. In some cases, you can identify these statements by our use of forward-looking words, such as "may," "might," "will," "could," "should," "expect," "plan," "anticipate," "believe," "estimate," "predict," "intend" and "continue," the negative or plural of these words and other comparable terminology. Forward-looking statements are based on information available to us as of the filing date of this Annual Report on Form 10-K and our current expectations about future events, which are inherently subject to change and involve known and unknown risks and uncertainties. You should not place undue reliance on these forward-looking statements. We have no obligation to update any of these statements, and we assume no obligation to do so. Actual events or results may differ materially from those expressed or implied by these statements due to various factors, including but not limited to the matters discussed below in the section entitled "Item 1A: Risk Factors," and elsewhere in this Annual Report on Form 10-K.

Our operating results have fluctuated in the past and are likely to continue to fluctuate. You should not rely on period-to-period comparisons of our financial results as indicators of our future performance. Some of the important factors that could cause our revenues, operating results and outlook to fluctuate from period to period include:

- customer demand for and adoption of our products;
- market and competitive conditions in our industry, the semiconductor industry and the economy as a whole;
- the timing and success of new technologies and product introductions by our competitors and by us;
- our ability to work efficiently with our customers on their qualification of our new technologies and products;
- our ability to deliver reliable, cost-effective products that meet our customers’ testing requirements in a timely manner;
- our ability to transition to new product architectures to solve next-generation semiconductor test and measurement challenges, and to bring new products into volume production on time and at acceptable yields and cost;
- our ability to implement measures for enabling efficiencies and supporting growth in our design, applications, manufacturing and other operational activities;
- the reduction, rescheduling or cancellation of orders by our customers;
- our ability to collect accounts receivables owed by our customers;
- our product and customer sales mix and geographical sales mix;
- reductions in the prices or the profitability of our products due to competitive pressures or other factors;
- the timely availability or the cost of components and materials utilized in our products;
- our ability to efficiently optimize manufacturing capacity and production yields as necessary to meet customer demand and ramp variable production volumes at our manufacturing facilities;
- our ability to protect our intellectual property against infringement and continue our investment in research and development and design activities;
- the timing of and return on our investments in research and development;
- any disruption in the operation of our manufacturing facilities;
- risks to the Company’s realization of benefits from acquisitions and investments in capacity and data systems;
- changes in trade, tariff or export regulations in the markets where we produce or sell our products; and
- factors impacting political and global economic stability, including natural disasters, epidemics (such as the current COVID-19, or coronavirus pandemic), military conflicts, climate change, and other factors acting alone or in combination;

PART I

Item 1: ***Business***

General

FormFactor, Inc., headquartered in Livermore, California, is a leading provider of test and measurement technologies. We provide a broad range of high-performance probe cards, analytical probes, probe stations, metrology systems, thermal systems and cryogenic systems to both semiconductor companies and scientific institutions. Our products provide electrical and physical information from a variety of semiconductor and electro-optical devices and integrated circuits from early research, through development, to high-volume production. Customers use our products and services to lower production costs, improve yields, and enable development of their complex next generation products.

FormFactor, Inc. was incorporated in 1993, and we introduced our first product in 1995. In October 2012, we acquired Astria Semiconductor Holdings, Inc., including its subsidiary Micro-Probe Incorporated (together "MicroProbe"); in June 2016, we acquired Cascade Microtech, Inc. ("Cascade Microtech" or "CMI"); in October 2019, we acquired FRT GmbH ("FRT"); in July 2020, we acquired the probe card assets of Advantest Corporation ("Baldwin Park"); and in October 2020, we acquired High Precision Devices, Inc. ("HPD"). These acquisitions have helped transform our business into a semiconductor test and measurement market leader with greater scale, diversification, breadth and market opportunities.

As of December 26, 2020, we operate in two reportable segments consisting of the Probe Cards Segment and the Systems Segment. Sales of our probe cards and analytical probes are included in the Probe Cards Segment, while sales of our probe stations, metrology systems, and thermal and cryogenic systems are included in the Systems Segment.

Products

We design, manufacture and sell multiple product lines, including probe cards, analytical probes, probe stations, metrology systems, thermal systems, and cryogenic systems, and related services.

Probe cards. Our probe cards utilize a variety of technologies and product architectures, including micro-electromechanical systems (MEMS) technologies. We use advanced design and automation technologies to enable rapid and cost-effective manufacturing of resilient composite contact elements with characteristic length scales of a few microns. These contact elements are designed to provide a specific range of forces on, and across, a chip's bond pad, solder bump, micro-bump, through-silicon-via (TSV), or copper pillar, during the test process and maintain their shape and position over a range of compression levels. In addition, while maintaining these mechanical characteristics, the contact elements must achieve reliable and high-fidelity electrical contact through wafer surfaces that are generally oxidized or otherwise contaminated, and must maintain these attributes over hundreds of thousands, and even millions, of compression cycles. Our range of capabilities enable us to rapidly produce customer-design specific probe cards that deliver leading precision, quality, reliability, and electro-mechanical performance.

Our probe cards are customized for our customers' unique wafer and chip designs by modifying and adapting our standard product architectures to meet an individual customer's specific wafer and chip design layouts and electrical test requirements. We offer probe cards to test a variety of semiconductor device types, including systems on a chip (SoC), mobile application processors, microprocessors, microcontrollers, graphic processors, radio frequency, analog, mixed signal, image sensors, electro-optical, DRAM memory, NAND flash memory and NOR flash memory devices.

For many advanced applications, our products must maintain tens of thousands of simultaneous high-fidelity low-impedance electrical contacts with the corresponding chip contacts on the wafer. Our present technologies enable probe cards with over 100,000 contact elements with spacings as small as 240 microns over geometries as large as an entire 300mm wafer. In addition, for high signal-fidelity devices such as wireless radio frequency transceivers and automotive radar chips, our probe card technologies are capable of testing at millimeter-wave frequencies range, currently up to 81 GHz.

We have invested, and intend to continue to invest, considerable resources in proprietary probe card design tools and processes. These tools and processes are intended to enable the rapid and accurate customization of products required to meet customer requirements, including automated routing and trace length adjustment within our probe cards, to rapidly design complex structures.

In addition, some of our customers test certain chips over a large range of operating temperatures, such as for automotive applications. We design probe cards to provide for a precise match with the thermal expansion characteristics of the wafer under test across the range of test operating temperatures. For many of our products, our customers can use the same probe card for both low and high temperature testing. We also design probe cards for customers that require extreme positional accuracy at a specific temperature.

Through ongoing investments in both our technology and operations, we continue to innovate and improve so that our products will meet customers' future technical roadmap performance, quality, and commercial requirements. We also focus upon leveraging these ongoing investments across all advanced probe card markets to realize synergies and economies of scale to benefit our competitiveness, time-to-market and overall profitability.

Analytical Probes. We offer over 50 different analytical probe models for engineering and production testing. Analytical probes are used for a diverse set of applications, including device characterization, electrical simulation model development, failure analysis, and prototype design debugging. Our customers for analytical probes include universities, research institutions, semiconductor integrated device manufacturers, semiconductor foundries, and fabless semiconductor companies. We continue to add new models of analytical probes that address measurements with higher complexities and at higher frequencies.

Probe Stations. Probe stations, also referred to as probing systems, are a critical tool for the development of new generations of semiconductor and electro-optical processes and designs. Probe stations are highly configurable for the required measurements, the size and type of wafer under test, the characteristics of the device design to be tested, and the temperatures at which testing is to be performed. Process development and design complexities have continually increased with each new generation of semiconductor technology to accommodate smaller design geometries, complex 3-D architectures, new materials and more layers. Probing systems are a fundamental tool for characterizing and verifying electrical performance and reliability to enable new semiconductor technologies. We design our probing systems for semiconductor design engineers to capture and analyze more accurate data in a shorter amount of time and to be able to control and manage testing at temperatures from near absolute zero to hundreds of degrees centigrade.

We build upon our probe stations to create integrated measurement systems that provide complete solutions for our customers' complex measurement requirements. These systems include test instrumentation, probe, cabling configurations, and software to enable fast, accurate, on-wafer data collection for complex application and measurement needs. We offer pre-configured and customized measurement systems for production testing, power device characterization, vacuum probing, cryogenic probing, high-pressure probing, photonics testing, and a variety of other specific applications.

Metrology Systems. We offer surface metrology systems for various applications including the development, production and quality control of semiconductor products. With resolution down to nanometer scales, these systems measure topography, structure, step height, roughness, wear, thickness variation, film thickness and other parameters. The modular architecture of the systems allows for the sensor configuration to be customized for the application while leveraging a common platform. These systems integrate hybrid metrology capabilities and proprietary software to enable non-destructive and rapid measurement of multiple features and parameters simultaneously, which has multiple applications but is particularly useful in the growing space of advanced packaging and MEMS applications.

Thermal Subsystems. Our thermal subsystems include thermal chucks and other test systems used in probe stations and other applications where precise temperature management is required. Thermal chuck systems enable the testing of devices at precise temperatures or across a range of temperatures. These systems are both marketed externally and allow for vertical integration with our probe stations.

Cryogenic Subsystems. Our cryogenic subsystems include the manufacture of precision cryogenic instruments. These include advanced cryogenic probe stations that function both at the wafer and the chip level, as well as Adiabatic Demagnetization Refrigerator (ADR) cryostats used in various applications, including cryogenic probe stations, sensor applications, quantum and super-conducting computing applications, and other situations where cryogenic temperature management is required. These systems are marketed externally and also allow for vertical integration with our existing cryogenic wafer probe stations and cryogenic engineering probes.

Services and Support. In addition to routine installation services at the time of sale, we offer services to enable our customers to maintain and more effectively utilize our products and to enhance our customer relationships. In addition to traditional maintenance services, our applications engineers assist our customers in test methodologies to make advanced measurements during process and product development, and during mass production.

Customers

Our customers include companies, universities and institutions that design or make semiconductor, and semiconductor related products in the Foundry & Logic, DRAM, Flash, Display and Sensor markets. Our customers use our products to test nearly all semiconductor device types, including SoCs, mobile application processors, microprocessors, quantum processors, microcontrollers, graphic processors, radio frequency, analog, mixed signal, image sensors, electro-optical, DRAM memory, NAND flash memory and NOR flash memory devices.

Fabless semiconductor suppliers do not manufacture their own semiconductors, but they purchase our analytical probes, probe stations, and other System products for research and development, and device characterization. They also purchase, or direct their foundries or wafer test facilities to purchase, our probe cards to test wafers manufactured for them.

We believe our customers consider timely service and support to be an important aspect of our relationship as our products are critical elements of high-volume manufacturing and design-specific product ramps. Our probe stations and metrology systems are installed at customer sites either by us, our manufacturers' representatives or our distributors, depending on the complexity of the installation and the customer's geographic location. We assist our customers in the selection, integration and use of our products through application engineering support. We also provide worldwide on-site probe card maintenance and service training, seminars and telephone support. In certain geographic regions, and for selected products, our manufacturers' representatives and distributors provide additional service and support.

Information concerning revenue by geographic region and by country based upon ship-to location appears under Item 7: Management's Discussion and Analysis of Financial Condition and Results of Operations - Revenues - Revenues by Geographic Region and Note 15 of the Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

Information concerning revenue concentration by customer appears under Note 2 of the Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K. The following customers represent 10% or more of our quarterly revenues:

	Fiscal Quarters Ended							
	Dec. 26, 2020	Sep. 26, 2020	June 27, 2020	Mar. 28, 2020	Dec. 28, 2019	Sep. 28, 2019	June 29, 2019	Mar. 30, 2019
Intel Corporation	29.3 %	25.6 %	36.1 %	36.2 %	28.4 %	23.9 %	26.1 %	21.3 %
Samsung Electronics., LTD.	12.5 %	10.6 %	*	*	14.8 %	*	11.1 %	13.8 %
SK hynix Inc.	*	*	*	*	*	13.5 %	*	*
Micron Technology, Inc.	*	10.1 %	*	*	*	11.9 %	10.1 %	*
Taiwan Semiconductor Manufacturing Co., LTD.	*	10.6 %	*	*	*	*	*	*
	41.8 %	56.9 %	36.1 %	36.2 %	43.2 %	49.3 %	47.3 %	35.1 %

***** Less than 10% of revenues.

Segment and Enterprise-Wide Disclosures

See Note 15 of the Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for certain financial information related to our segments and our enterprise-wide disclosures.

Manufacturing

Our probe cards are designed for each of our customers' unique designs, by modifying and adapting our product architectures to meet an individual customer's chip layout and test requirements. Our proprietary manufacturing processes for our probe cards include a complex interconnection system-level design process; a front-end process, which may include wire bonding, photolithography, plating and metallurgical processes, dry and electro-deposition, pick and place assembly; and a back-end process, which includes general assembly and test. Critical steps in our manufacturing process are performed in a variety of clean room environments as stringent as a Class 100, depending on the requirements of the specific manufacturing processes.

Our probe stations and metrology systems are designed to provide highly accurate electrical and optical measurements enabled by precise and reliable mechanical components and assemblies. We prototype and perform robust testing of our product designs and components to ensure high electrical signal integrity, mechanical accuracy and safety. We also monitor our product quality throughout the various stages of our manufacturing processes using a variety of process control methods and tests.

We depend on suppliers for materials and some critical components of our manufacturing processes, including ceramic and organic substrates and complex printed circuit boards. We also rely on suppliers to provide certain contact elements and interconnects that are incorporated into our products. Some of these components and materials are supplied by a single vendor, and some are subject to certain minimum order quantities. Generally, we rely on purchase orders rather than long-term contracts with our suppliers, which subjects us to risks, including price increases, manufacturing capacity constraints and component shortages. We continually assess and evaluate alternative sources of supply for all components and materials.

Our primary manufacturing facilities are located in Livermore, San Jose, Carlsbad, and Baldwin Park, California, Beaverton, Oregon, Boulder, Colorado, United States, and in Thiendorf, Germany. We also perform manufacturing operations in our facilities in Munich and Bergisch Gladbach, Germany; Suzhou, China; and Yokohama, Japan.

We maintain repair and service capabilities in Livermore, San Jose, and Carlsbad, California and Beaverton, Oregon, United States; Thiendorf, Dresden and Munich, Germany; Montbonnot Saint Martin, France; Bundang, South Korea; Yokohama and Hiroshima, Japan; Suzhou and Shanghai, China; Hsinchu, Taiwan; and Singapore.

Research, Development and Engineering

The semiconductor industry is subject to rapid technological change with a continuous stream of new product introductions and technology enhancements. We believe that our continued commitment to research and development and our timely introduction of new and enhanced products and technologies are integral to maintaining and enhancing our competitive position. We allocate significant resources to these efforts and prioritize those resources to prepare for our customers' next generation electrical test and measurement challenges. We also increasingly seek to deploy our resources to solve fundamental challenges that are both common to, and provide competitive advantage across, our probe card and system product offerings and roadmaps.

Sales and Marketing

We sell our products worldwide through a global direct sales force and through a combination of manufacturers' representatives and distributors.

Our direct sales and marketing staff is located in the United States, China, France, Germany, Italy, United Kingdom, Japan, Singapore, South Korea, and Taiwan. They work closely with customers in the effort to understand their businesses, anticipate trends and define products that will provide significant technical and economic advantages to our customers. We employ a highly skilled team of application and customer support engineers that support our customers as they integrate our products into their research, development and manufacturing processes. Through these customer relationships, we seek to develop a close understanding of customer and product requirements to align our capabilities with our customers' roadmaps and production ramps.

We also have a network of representatives and distributors across the globe to broaden our reach. We engage sales representatives to act as independent third parties that agree to promote our products, at our prices and on terms set by us, in return for a commission based on sales. We typically use sales representatives in areas that we believe require greater levels of customer support than we can deliver from our own sales offices and where local language capabilities can offer an advantage. Our distributors purchase our products and resell them at prices and upon terms set by the particular distributor. We typically use distributors in particular geographies due to local regulations or business customs.

Environmental Matters

We are subject to U.S. federal, state, local, and foreign governmental laws and regulations relating to the protection of the environment, including those governing the discharge of pollutants into the air and water, the management and disposal of hazardous substances and wastes, the clean-up of contaminated sites and the maintenance of a safe workplace. We believe that we comply in all material respects with the environmental laws and regulations that apply to us as of December 26, 2020. We did not receive any notices of violations of environmental laws and regulations in fiscal 2020, 2019 or 2018. In the future, we may receive notices of violations of environmental regulations, or otherwise learn of such violations. Environmental contamination or violations may negatively impact our business.

Competition

The markets for our products are highly competitive and we anticipate that these markets will continually evolve and be subject to rapid technological change. Our current and potential competitors are as below:

Probe Card Market. The probe card market comprises of many domestic and foreign companies, and has historically been fragmented with many local suppliers servicing individual customers in often differentiated applications. Our primary competitors are AMST Co., Ltd., Feinmetall GmbH, Japan Electronic Materials Corporation, Korea Instrument Co., Ltd., M2N Co., Ltd., Microfriend Inc., Micronics Japan Co., Ltd., MPI Corporation, Micro Square Technology Inc., NHK Spring Co., Ltd., Soulbrain Engineering, Nidec SV TCL, Synergie CAD, TechnoProbe S.p.A, TSE Co., Ltd., WinWay Technology Co., Ltd., WILL-Technology Co., Ltd., and Yokowo, among others.

Probe card vendors such as Japan Electronic Materials Corporation, Micronics Japan Company, Ltd. and TechnoProbe, offer probe cards built using similar types of MEMS technology as do we. The high capital investment and other costs associated with the development of MEMS probe cards and the time and high cost of the customer evaluation process represent significant barriers to entry for this type of technology.

We believe that the primary competitive factors in the production probe card market depend upon the type of integrated circuit being tested, but also include customer service, knowledge of measurement techniques, delivery time, price, probe card lifetime, chip damage prevention, probe tip touch-down accuracy, speed and frequency of the probe card, number of chips contacted in parallel, number of probe tips and their layout and pitch, signal integrity, and frequency and effectiveness of any required cleaning. As a result of our relative strengths in these areas, we believe that we compete favorably in the advanced probe card market, and in probe cards for parallel testing of chips with densely-packed bond pads, bumps or pillars, and in high signal integrity testing of wireless radio frequency devices that operate up to millimeter-wave frequencies, a capability needed for components used in 5G applications.

Analytical Probes. Our primary competitor in the analytical probe market is GGB Industries Inc. Regional competitors include Yokowo and TechnoProbe Co Ltd. in Japan, and MPI/Allstron in Taiwan. We believe that the primary competitive factors in this market are breadth of probe types, probe frequency and electrical signal integrity, contact integrity and the related cleaning required, knowledge of measurement techniques, calibration support, delivery time and price. We believe that we compete favorably with respect to these factors.

Probe Stations. Our primary competitors in the probe station market are HiSOL, Inc., LTD/Accretech, The Micromanipulator Company Inc., MPI Corporation, Semiprobe, Signatone Corporation, Tokyo Electron (“TEL”), Tokyo Seimitsu Co., Vector Semiconductor Co. Ltd., and Wentworth Laboratories Inc. We believe that the primary competitive factors in the probe station market are measurement accuracy and versatility at temperature, including cryogenic temperatures, measurement speed, automation features, knowledge of measurement techniques, completeness of the measurement solutions, delivery time and price. We believe that we compete favorably with respect to these factors.

Metrology Systems. Our primary competitors in the metrology system market are Bruker Corporation, Camtek Ltd., Cohu, Inc., Filmetrics, Onto Innovation, and Unity SC. We believe that the primary competitive factors in this market are breadth of measurement types, measurement accuracy, measurement speed and throughput, ability apply algorithms to multiple sensor inputs to indirectly measure attributes not otherwise directly observable, knowledge of measurement techniques and applications, delivery time and price. We believe that we compete favorably with respect to these factors.

Thermal Subsystems. In the market for thermal subsystems, we compete principally against ERS Electronic GmbH, Espec Corp, and Temptronic Corporation. In addition, many of our probe station competitors develop and produce their own thermal subsystems for use in their products. We believe the primary competitive factors in this market are thermal performance, reliability, flexibility and completeness of product offerings. We believe that we compete favorably with respect to these factors.

Cryogenic Subsystems. In the market for cryogenic subsystems, we compete principally against Bluefors Oy, Entropy, Lakeshore Cryotronics, Inc. (which recently acquired Janis Research), Leiden Cryogenics B.V., Montana Instruments, Nagase Techno-Engineering Co., Oxford Instruments, and STAR Cryoelectronics. We believe the primary competitive factors in this market are cryogenic performance, reliability, throughput and application expertise. We believe we compete favorably with respect to these factors.

Some of our competitors are also suppliers of other types of test and measurement equipment or other semiconductor equipment and may have greater financial and other resources than we do. Our competitors may enhance their current products and may introduce new products that will be competitive with ours. New alternatives to our products may also be introduced, by our current competitors or others, which may reduce the value of one or more of our products.

Semiconductor manufacturers may implement chip designs that include capabilities or use other methodologies that increase test throughput and reduce test content. This may reduce or eliminate some or all of our current products’ advantages. Semiconductor manufacturers may also increase their use of test strategies that include low performance semiconductor testers, less complex probe cards, or test procedures that do not involve our products. Our ability to compete favorably may also adversely be affected by the long-standing relationships between our competitors and certain semiconductor manufacturers.

Intellectual Property

Our success depends in part upon our ability to continue to innovate and invest in research and development to meet the test and measurement requirements of our customers, to maintain and protect our proprietary technology, and to conduct our business without infringing on the proprietary rights of others. We rely on a combination of patents, trade secrets, trademarks and contractual restrictions on disclosure to protect our intellectual property rights. We have filed actions to enforce those rights against third parties in the past, and may pursue such actions in the future.

We have generated, and continue to generate and maintain, patents and other intellectual property rights covering innovations that are intended to create a competitive advantage, and to support the protection of our investments in research and development. We believe that we possess one of the most substantial patent portfolios relevant to our products.

Although we believe that our patents and other intellectual property rights have significant value for each of our segments, we do not believe that maintaining or growing our business is materially dependent on any single patent. Due to the rapid pace of innovation within the markets that we serve, it is possible that our protection through patents may be less important than factors such as our technological expertise, continuing development of new products and technologies, protection of trade secrets, market penetration, customer relationships, and our ability to provide comprehensive support and service to customers worldwide.

No assurance can be given that any patents will not be challenged, invalidated or circumvented, or that the rights granted thereunder will provide us with a sustained competitive advantage. In addition, there can be no assurance that we will be able to protect our technology, or that competitors will not be able to independently develop similar or functionally competitive technologies, design around our patents, or attempt to manufacture and sell infringing products in countries that do not strongly enforce intellectual property rights.

Human Capital

We believe that each employee contributes to our culture of integrity, innovation, and teamwork. We reinforce this culture through our human capital development programs that drive talent acquisition, retention and employee engagement. These programs include carefully designed compensation at all levels, a variety of training, diversity and inclusion objectives, and other initiatives.

Our compensation programs help attract and retain key talent and are designed for our employees to share in our company’s success. These programs focus on compensation that we believe is market-competitive, reflect company performance, and align with drivers of stockholder value with differentiation based on performance, skills, geographic location, and tenure. We use information from outside compensation and benefits consulting firms to evaluate the competitiveness of the compensation we offer to employees in specific job types, and the structure of our compensation programs, to help provide benchmarking against our peers within the industry.

We also offer a variety of benefits such as health insurance, paid and unpaid leaves, retirement, life and disability/accident coverage as applicable to their geographic location. We also offer a variety of other benefits which allow employees to select the options which meet their needs such as for wellness, insurance and professional services.

Our training initiatives promote the continuous improvement of our workforce to keep pace with an ever-increasingly complex business and industry. In addition to formal training, the capabilities of our workforce grow through structured feedback, mentorships, team building, career progression, tuition assistance, and a culture of transparency. In 2020, we implemented a new training management platform, allowing for a more organized and efficient administration of training to our employees. Our training initiatives are designed to foster skills development, compliance and our company values.

We leverage both formal and informal programs to identify, foster, and retain top talent. On an annual basis, we have conducted a talent review process with our chief executive officer, leaders of our business units and functions that is focused upon performance, potential, diversity, and succession for critical roles.

Our commitment to diversity and inclusion is a significant part of our human capital development programs. We believe that the recruitment, retention and promotion of a balanced workforce is an important driver of company performance. We support these values through sponsored events, networking groups, and management objectives. As an equal opportunity employer, we develop and implement an annual and targeted affirmative action plan reflecting specific metrics.

We also inspire employee engagement through our commitment to corporate social responsibility, including in defined focus areas of sustainable technology, health and safety, labor and human rights, energy and climate change, supply chain responsibility and waste and chemical management.

Our workplace health and safety programs include robust policies, procedures, training programs, and self-audits. Nearly all of our manufacturing employees are located in California, Oregon and Germany, where workplace safety and labor regulations support maintaining high standards of employee protection. We have also been demonstrating a focus on health and safety in our response to the COVID-19 pandemic world-wide, including work-from-home flexibility, requiring those who may be sick to stay home; COVID-19 safety protocols across all locations, including social distancing, personal protective equipment and cleanings; regular internal communication regarding impacts of the COVID-19 pandemic and safety protocols; temperature screening at our manufacturing facilities; and restrictions on domestic and international non-essential travel.

We believe that our current human capital is appropriate to serve the requirements of our business, and that our human capital development programs and other initiatives are well designed to maintain the quality of our human capital.

For our manufacturing activities, the speed at which we can recruit, train and deploy quality new and replacement personnel is an important part of our ability to ramp up and maintain our production capacity. We rely upon both employees and resources from staffing firms to meet our needs for direct labor. Speed, accuracy and agility in this process is important to our business. Similarly, it is important to our business that we are able to regularly recruit and train quality new and replacement design and engineering staff. For example, our probe card products require that we develop custom designs for our customers' new product designs. We face strong competition from companies in a variety of technology fields to secure the engineering talent that we require. In addition, restrictions on immigration and skilled-worker visas in a variety of jurisdictions impacts the ease and flexibility with which we can develop these resources.

As of December 26, 2020, we had 2,166 regular full-time employees, including 1,322 in operations, 383 in research and development, 301 in sales and marketing and 160 in general and administrative functions. By region, 1,566 of our employees were in North America, 347 in Asia and 253 in Europe. As of December 26, 2020, our Probe Cards Segment had 1,567 regular full-time employees, our Systems Segment had 399 regular full-time employees, plus we had 200 regular full-time employees in corporate functions. None of our employees in the United States are covered by a collective bargaining agreement. Certain employees at our manufacturing facility in Germany are represented by a works council. Our employees take pride in their work and we believe that our overall relations with our employees is positive.

Available Information

We maintain a website at *http://www.formfactor.com*. We make available free of charge on our website our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the United State Securities and Exchange Commission, or SEC. The reference to our website does not constitute incorporation by reference of the information contained at the site.

Directors and Executive Officers

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders.

Item 1A: *Risk Factors*

In addition to the other information in this Annual Report on Form 10-K, you should carefully consider the risk factors discussed in this Annual Report on Form 10-K in evaluating FormFactor and our business. If any of the identified risks actually occur, our business, financial condition and results of operations could be materially adversely affected, the trading price of our common stock could decline, and you may lose all or part of your investment in our common stock. The risks and uncertainties described in this Annual Report on Form 10-K are not the only ones we face. Additional risks that we currently do not know about, or that we do not consider sufficiently important to describe here in accordance with applicable regulations, may also impair our business operations or the trading price of our common stock.

Risks Relating to our Operations and the Nature of Our Business

The markets in which we participate are competitive, and if we do not compete effectively, our operating results could be harmed.

We have experienced increased competition in the markets in which we operate, and we expect competition to intensify in the future. Increased competition has resulted in, and in the future is likely to result in, price reductions, reduced gross margins or loss of market share.

Existing competitors might introduce new competitive products for the same markets that our products currently serve. These products may have better performance, lower prices, shorter delivery times or broader acceptance than our products.

In addition, new competitors, including test equipment manufacturers, may offer comparable or new technologies that reduce the value of our products. Also, semiconductor manufacturers may implement chip designs or methodologies that increase test throughput, reduce test content, or change their test procedures, thereby eliminating some or all of our current product advantages.

Our current or potential competitors may have larger customer bases, more established customer relationships or greater financial, technical, manufacturing, marketing and other resources than we do. As a result, they might be able to respond more quickly to new or emerging technologies and changes in customer requirements, devote greater resources to the development, promotion, sale and support of their products, and reduce prices to increase market share.

If we do not innovate and keep pace with technological developments in the semiconductor industry, our products might not be competitive, and our revenues and operating results could suffer.

We must continue to innovate and to invest in research and development to improve our competitive position and to meet the test and measurement requirements of our customers. Our future growth depends, in significant part, upon our ability to work effectively with and anticipate the future technical and operational needs of our customers and to develop and support new products and product enhancements to meet these needs on a timely and cost-effective basis. Our customers' needs are becoming more challenging as the semiconductor industry continues to experience rapid technological change driven by the demand for complex circuits that are shrinking in size, are increasing in speed and functionality, and are produced on shorter cycle times and at reduced unit cost.

Successful product design, development and introduction on a timely basis require that we:

- collaborate with customers to understand their future requirements;
- design innovative and performance-enhancing product architectures, technologies and features that differentiate our products from those of our competitors;
- in some cases, engage with third parties who have particular expertise in order to complete one or more aspects of the design and manufacturing process;
- qualify with the customer(s) the new product, or an existing product incorporating new technology;
- transition our products to new manufacturing technologies;
- offer our products for sale at competitive price levels while maintaining our gross-margins within our financial model;
- identify emerging technological trends in our target markets;
- maintain effective marketing strategies;
- respond effectively to technological changes or product announcements by others; and
- adjust to changing market conditions quickly and cost-effectively.

Not only do we need the technical expertise to implement the changes necessary to keep our technologies current, but we must also rely heavily on the judgment of our management to anticipate future market trends. If we are unable to timely predict industry changes or industry trends, or if we are unable to modify our products or design, manufacture and deliver new products on a timely basis, or if a third party with which we engage does not timely deliver a component or service for one of our product modifications or new products, we might lose customers or market share. In addition, we might not be able to recover our research and development expenditures, which could harm our operating results.

We depend upon the sale of our probe card products for the substantial majority of our revenues.

We derive the majority of our revenues from the sale of our probe card products, primarily to manufacturers of microprocessor, foundry & logic and memory devices, despite progress in diversifying our product offerings. We anticipate that sales of probe cards will represent a substantial majority of our revenues for the foreseeable future. Our success depends in large part upon the continued acceptance of our products on the basis of a variety of factors including performance, quality, timely delivery and price, and depends upon our ability to continue to develop and introduce new products that meet our customers' requirements. The degree to which we depend upon the sales of our probe card products for our revenues may increase our susceptibility to failures to satisfy the customers for such products, which may adversely affect our revenues and our ability to grow our business.

We derive a substantial portion of our revenues from a small number of customers.

A relatively small number of customers account for a significant portion of our revenues. One customer represented 31.5% of total revenues in fiscal 2020, two customers represented a combined 36.8% of total revenues in fiscal 2019 and one customer represented 19.0% of total revenues in fiscal 2018. We anticipate that sales of our products to a relatively small number of customers will continue to account for a significant portion of our revenues and can drive material fluctuations in sales volume. Consolidation in the semiconductor industry may increase this concentration. In the future, the loss of any of these customers, or cancellation, reduction or deferral of even a small number of purchases of our products by these customers, could significantly reduce our revenues. A decline in our customers' market share and commercial success, including their ability to compete favorably within their respective end markets, could significantly impact demand for our products and reduce our revenues. Cancellations, reductions, deferrals or non-payment of invoices, could result from another downturn in the semiconductor industry, manufacturing delays, quality or reliability issues with our products, or from interruptions to our customers’ operations due to fire, natural disasters or other events, or other issues with the financial stability of our customers. Furthermore, because our probe cards are custom products designed for our customers’ unique wafer designs, any cancellations, reductions or delays can result in significant non-recoverable costs. In some situations, our customers might be able to cancel or reduce orders without a significant penalty.

If our relationships with our customers deteriorate, our product development activities could be harmed.

The success of our product development efforts depends upon our ability to anticipate market trends and to collaborate closely with our customers. Our relationships with these customers provide us with access to valuable information regarding manufacturing and process technology trends in the semiconductor industry, which enables us to better plan our product development activities. These relationships also provide us with opportunities to understand the performance and functionality requirements of our customers, which improves our ability to customize our products to fulfill their needs. Our relationships with our customers could deteriorate as a result of a variety of factors, such as if they become concerned about our ability to deliver quality products on a timely basis or to protect their intellectual property. Many of our customers are large companies that place significant orders with us, and the consequences of deterioration in our relationship with any of these companies could be significant due to the competitiveness of our industry and the significant influence that these companies exert in our market.

Consolidation in the semiconductor industry and within the semiconductor test equipment market could adversely affect the market for our products and negatively impact our ability to compete.

Consolidation in the semiconductor industry may reduce our customer base and could adversely affect the market for our products, which could cause a decline in our revenues. With consolidation, the number of actual and potential customers for our products has decreased in recent years. Consolidation may lead to relatively fewer opportunities to sell our products if we are not chosen as a supplier by any given prospective customer, and may lead to increased pricing pressures from customers that have greater volume purchasing power.

There has also been consolidation within the semiconductor test equipment market. This consolidation trend could change our interactions and relationships with complementary tester, instrument, and prober suppliers and negatively impact our revenue and operating results.

Changes in customers’ test strategies, equipment and processes could decrease customer demand for our products.

The demand for our products depends in large part upon the number of semiconductor designs, the pace of technology and architecture transitions in chip designs and overall semiconductor unit volume. The number of probe cards involved in a customer’s wafer testing can depend upon the number of devices being tested, the complexity of these devices, the test software program, the test equipment itself, and the utilization of chip designs featuring design-for-testability or self-testing capabilities. Customers may demand fewer probe cards or probing systems if they use test strategies that reduce the technical requirements on test equipment, improve available data on device performance earlier in the manufacturing process, or test devices later in the manufacturing process. Changes in the effectiveness of test technologies and test strategies used by customers may cause us to lose sales and revenues.

We may also lose sales if new semiconductor technologies or designs are implemented which cannot be efficiently tested using the products that we offer, or if semiconductor manufacturers reduce the amount or degree of testing that they perform. We may also incur significant research and development expenses in order to introduce new product architectures and platforms to serve the testing needs of new semiconductor technologies.

Cyclicality in the semiconductor industry may adversely impact our sales.

The semiconductor industry has historically been cyclical and is characterized by wide fluctuations in product supply and demand. From time to time, this industry has experienced significant downturns, often in connection with, or in anticipation of, maturing product and technology cycles, excess inventories and declines in general economic conditions. The global economic and semiconductor downturns have caused and may in the future cause our operating results to decline dramatically from one period to the next. Global economic stability can be negatively affected by a variety of factors and interrelationships, including the potential impact of Brexit, epidemics and pandemics (such as the current COVID-19 pandemic), military conflicts, climate change, trade barriers and other factors acting alone or in combination. Some of these factors can also have a more direct adverse impact upon our operations to varying degrees. Our business depends heavily upon the development and manufacture of new semiconductors, the rate at which semiconductor manufacturers make transitions to smaller nanometer technology nodes and implement tooling cycles, the volume of production by semiconductor manufacturers and the overall financial strength of our customers, which, in turn, depend upon the current and anticipated market demand for semiconductors and products, such as servers, personal computers, automobiles and cell phones, that use semiconductors. During industry downturns, semiconductor manufacturers sharply curtail their spending, including their spending on our products, which may adversely impact our revenues, gross margins and results of operations. Further, a protracted downturn could cause one or more of our customers to become insolvent, resulting in a loss of revenue and impacting our ability to collect on accounts receivable. The timing, length and severity of these cyclical downturns are difficult to predict and our business depends on our ability to plan for and react to these cyclical changes.

Because we generally do not have a sufficient backlog of unfilled orders to meet our quarterly revenue targets, revenues in any quarter are substantially dependent upon customer orders received and fulfilled in that quarter.

Our revenues are difficult to forecast because we generally do not have sufficient backlog of unfilled orders to meet our quarterly revenue targets at the beginning of a quarter. Rather, a substantial percentage of our revenues in any quarter depend upon customer orders for our products that we receive and fulfill in that quarter. Because our expense levels are based in part on our expectations as to future revenues and to a large extent are fixed in the short term, we might be unable to adjust spending in time to compensate for any unexpected shortfall in revenues. Accordingly, any significant shortfall of revenues in relation to our expectations could hurt our operating results.

If our ability to forecast demand for our products or the predictability of our manufacturing yields deteriorates, we could incur high inventory losses.

Each semiconductor chip design requires a custom probe card. Because our probe card products are design-specific, demand for these products is difficult to forecast. Due to our customers' short delivery time requirements, we often design and procure materials and, at times, produce our products in anticipation of demand for our products rather than in response to an order. Our manufacturing yields and inventory requirements, particularly for new products or when we are operating at high output levels, have at times been unpredictable. If we do not obtain orders as we anticipate, if we suffer manufacturing errors, or if we build additional inventory to compensate for unpredictable manufacturing yields, we could have excess or obsolete inventory that we may not be able to sell, which would likely result in inventory write-offs or material charges for scrap.

If we are unable to efficiently manufacture our existing and new products, our business may be materially adversely affected.

We must continuously improve our manufacturing processes in an effort to increase yields and product performance, lower our costs and reduce the time required for us to design, manufacture and deliver our products in volume. If we cannot do these things, both our existing products and our new products may not be commercially successful, our revenues may be adversely affected, our customer relationships and our reputation may be harmed and our business may be materially adversely affected.

To improve our manufacturing processes, we have incurred, and may incur in the future, substantial costs in an effort to optimize capacity and yields, open new manufacturing facilities, implement new manufacturing technologies, methods and processes, purchase new equipment, upgrade existing equipment and train technical personnel. We have experienced, and may experience in the future, manufacturing delays and other inefficiencies in connection with implementation of these improvements and customer qualifications of new processes or products, which have caused and could cause in the future, our operating results to decline. These delays and other inefficiencies may arise from a variety of factors, including disruptions to or the unavailability of sufficient electrical power as a result of insufficient electrical power infrastructure in the regions where we have manufacturing facilities such as in California.

We have also experienced, and may experience in the future, difficulties in manufacturing our complex products in volume on time, and at acceptable yields and cost, and installation issues in the field, due to the complexity of customer requirements.

If we are unable to continue to reduce the time it takes for us to design and produce products, our growth could be impeded.

Our customers continuously seek to reduce the time it takes them to introduce new products to market. The cyclicality of the semiconductor industry, coupled with changing demands for semiconductor products, requires our customers to be flexible and highly adaptable to changes in the design, volume and mix of products they must produce. We may be unable to design, configure and produce our products within the short cycle times required to respond to such rapid changes. We have lost sales in the past where we were unable to meet a customer's required delivery schedules. If we are unable to continue to reduce the time it takes for us to design, manufacture and ship our products in response to the needs of our customers, our competitive position could be harmed and we could lose sales.

Products that do not meet specifications or that contain defects could damage our reputation, decrease market acceptance of our technology, cause us to lose customers and revenues, and result in liability to us.

The complexity and ongoing development of our product designs and manufacturing processes could lead to design or manufacturing problems. Problems might result from a number of factors, including design defects, materials failure, failure of components manufactured by our suppliers to meet our specifications, contamination in the manufacturing environment, impurities in the materials used, and unknown sensitivities to process conditions such as temperature and humidity, and equipment failures. Any errors or defects could:

- cause lower than anticipated yields and lengthen delivery schedules;
- cause delays in product shipments;
- cause delays in new product introductions;
- cause us to incur warranty expenses;
- result in increased costs and diversion of development resources;
- cause us to incur increased charges due to unusable inventory;
- require design modifications;
- could have implications for timing of revenue recognition and associated costs; or
- decrease market acceptance or customer satisfaction with these products.

The occurrence of any one or more of these events could adversely affect our business, reputation and operating results.

As part of our sales process, we could incur substantial sales and engineering expenses that do not result in revenues.
Our customers generally expend significant efforts evaluating and qualifying our products prior to placing an order. While our customers are evaluating our products, we might incur substantial sales, marketing, and research and development expenses. For example, we typically expend significant resources educating our prospective customers regarding the uses and benefits of our products and customizing them to the potential customer’s needs, for which we might not be reimbursed. The substantial resources we commit to our sales efforts may not result in any revenues from a customer. For example, many semiconductor processes, architectures, and designs never reach production, including those for which we may have expended development effort and expense. In addition, prospective customers might decide not to use our products or use our products for a relatively small percentage of their requirements after we have expended significant effort and expense toward product design, development, and/or manufacture.

We obtain some of the components and materials we use in our products from a sole source or a limited group of suppliers, and the partial or complete loss of one of these suppliers could cause production delays.
We obtain some of the components and materials used in our products, such as printed circuit board assemblies, plating materials and ceramic substrates, from a sole source or a limited group of suppliers, and in some cases alternative sources are not currently available. Because we rely on purchase orders rather than long-term contracts with the majority of our suppliers, we cannot guarantee our ability to obtain components and materials in the long term. A sole or limited source supplier could increase prices, which could lead to a decline in our gross profit. Our dependence upon sole or limited source suppliers exposes us to several other risks, including inability to obtain an adequate supply of materials, late deliveries, poor component quality, and business disruptions while we seek to identify and qualify alternative suppliers. This could be exacerbated by certain events outside the control of either the supplier or us, such as the COVID-19 pandemic. The occurrence of any of these risks could adversely impact our business, results of operations and financial condition.

Our operations, or those of our important suppliers, business partners and customers could be adversely affected by events outside of our control such as natural disasters, pandemics and man-made disasters.
Our business is vulnerable to the direct and indirect impact of natural and man-made disasters, such as floods, earthquakes, volcanic eruptions, nuclear accidents, acts of terrorism, epidemics, pandemics, military conflicts, climate change, and other factors acting alone or in combination. It is also possible that future natural and man-made disasters could negatively impact the sales of our products as a result of impacts upon our customers’ ability to make or sell their products, or impacts upon our suppliers’ ability to supply components to us on a timely basis.

For example, the COVID-19 pandemic has shown the extent to which new pathogens are capable of disrupting business operations and economic activity locally and worldwide. Epidemics and pandemics can severely disrupt global supply chains, including for parts and materials that we use to manufacture our products, and affect economic conditions in the markets for our products. The circumstances which give rise to epidemics and pandemics from new or existing pathogens with similar impacts are expected to persist indefinitely.

Another example of events outside of our control arises from our manufacturing facilities being located in seismically active areas in California and Oregon. The manufacturing equipment and processes that we use can be severely disrupted by seismic activity. A significant seismic event in the areas of our operations could have a materially negative impact on our operations, financial results or financial condition.

Much of the infrastructure on which we rely for our operations is outside of our control, such as for electric power. We have recently experienced disruptions to electrical power at some of our premises in California, especially when aging infrastructure or inadequate electric power service has been impacted by high demand, fires, and weather which may worsen over time with climate change, and other events. Our efforts to mitigate the effects on us from interruptions in the availability of electric power, or other infrastructure, may not adequately prevent materially negative impacts on our operations, and in turn our financial results.

The COVID-19 pandemic has impacted, and is expected to continue to negatively impact, our operations, and those of our important suppliers, business partners and customers.

We are exposed to risks associated with public health crises and outbreaks of contagious diseases, such as COVID-19. To date, COVID-19 has had, and may continue to have, an adverse impact on our operations, our supply chains and our expenses, including as a result of precautionary measures that we take in response to COVID-19. A variety of health orders and regulations arising from the pandemic apply to our operations and employees in the regions where we operate which have had, and will continue to have, negative affects upon our operations and business. Even as the availability of vaccines may begin to relieve the economic effects of the COVID-19 pandemic in the future, there remains substantial risk that vaccination rates will remain slow, new variants of the virus may impede the vaccines' efficacy, or other factors may prolong or worsen the pandemic and its direct and indirect affects upon our business.

A significant amount of our management resources have been, and will continue to be, focused on mitigating the negative impacts of COVID-19 on our business. This has required, and will continue to require, a substantial investment of time and resources across our enterprise which may continue to negatively impact other valuable activities, such as the development of new technologies, products or capabilities. In addition, many of our employees are working remotely for an extended period, which can increase operational risk and cybersecurity risks. If we do not respond appropriately to the COVID-19 pandemic, or if employees, customers or others do not perceive our response positively, we could suffer damage to our reputation, which could also adversely affect our business.

We obtain some of the components and materials used in our products from a sole source or a limited group of suppliers, and in some cases alternative sources are not readily available. The COVID-19 pandemic may heighten the risks posed by our dependence upon sole or limited source suppliers to the extent that the pandemic could disrupt the operations of one or more of these suppliers, resulting in an inability to obtain an adequate supply of materials, late deliveries or poor component quality while we seek to identify and qualify alternative suppliers.

The extent to which the COVID-19 pandemic impacts our operations and those of our important, suppliers, business partners and customers will depend on numerous evolving factors and future developments that we are not able to predict, including but not limited to: the severity and duration of the pandemic; governmental, business and other actions (which could include further restrictions on our operations); the ongoing requirements of social distancing and health orders; the impacts on our supply chain; the impact of the pandemic on economic activity; the extent and duration of the effect on business confidence and investments by our customers; the effects of changes to our operations that may continue indefinitely; the effects on our workforce and our ability to meet our staffing needs, particularly if members of our workforce are exposed or infected; any impairments in the value of our assets; and the potential impacts upon our internal controls, including those over financial reporting, that may result from changes in working environments and other circumstances. All of these circumstances are highly uncertain and cannot be predicted. In addition, the circumstances which give rise to new or existing infectious diseases becoming epidemics or pandemics with potentially similar impacts are expected to persist.

Adverse global, regional and national economic conditions resulting from the COVID-19 pandemic could have a negative effect on our business, results of operations and financial condition and liquidity.

The COVID-19 pandemic has adversely affected, and may continue to adversely affect, national, regional and global economies and financial markets. Although the long-term macroeconomic effects of the pandemic cannot be predicted with certainty, the continued progression or persistence of the pandemic may result in global, regional or national economic slowdowns or other economic downturns. Such downturns could curtail or delay spending by businesses and consumers which may ultimately result in reductions in the demand for our products and greater volatility in demand and supply conditions. The COVID-19 pandemic has also increased uncertainty in global credit and financial markets. The impacts of such uncertainty and disruptions to the availability of credit or other sources of capital as the pandemic continues or worsens, could also adversely affect our ability to access capital on favorable terms to meet our objectives. Any of these factors could have a material adverse impact on our business, results of operations, financial condition and cash flows.

In addition, governments in several countries where we operate, including the United States, have enacted stabilization and stimulus measures in an effort to counteract some of the economic impacts of COVID-19. The demand and business environments in which we operate have benefited from some of these measures, while the long-term economic impacts of increased government borrowing to fund these measures may have future negative effects on certain economies. Any significant discontinuations, reductions, or other changes to such stabilization and stimulus programs may harm our customers' or suppliers' financial results and financial condition, and could also have an adverse macroeconomic impact that may lead to reductions in the demand for our products. Even if maintained or expanded, such stimulus and stabilization measures may fail over the long term to mitigate the adverse economic effects of the pandemic, and may fail to prevent or exacerbate any long-term economic downturns.

As a result of the uncertain scope and duration of the COVID-19 pandemic and the uncertain timing of any national, regional or global recovery and economic normalization, we are unable to estimate the ultimate impacts on our operations and financial results.

We rely on the security and integrity of our electronic data systems, and the proper design and implementation of these systems for our business requirements, and our business can be damaged by deficiencies, disruptions, security breaches or compromises of these systems.

We rely on electronic data systems, including a variety of software and networking, computing and storage equipment and other information technologies, to operate and manage our business and to collect, process, maintain, and safeguard information, including information belonging to our customers, partners, and personnel.

Our electronic data systems may be subject to defects, failures or disruptions as a result of, among other things, natural disasters, accidents, power disruptions, telecommunications failures, deficiencies in new system designs and implementations, acts of terrorism or war, physical security breaches, computer viruses or other cyber security attacks.

For example, in June 2020, we discovered a data breach incident involving malware and related behaviors that resulted in unauthorized access to our information technology systems. Although we do not believe this incident had any significant impacts on our production and ordinary course operations, such incidents or other system failures or disruptions could subject us to downtime and delays, compromise or loss of sensitive or proprietary information, destruction or corruption of data, financial losses from remedial actions, breaches of obligations to third parties under privacy laws or contracts, or damage to our reputation or customer relationships. Any of the foregoing could have a material adverse effect on our business, operating results and financial condition.

In addition, we are actively implementing new electronic data systems relating to substantial parts of our business, operations and accounting. The process of implementing and commencing our reliance on these new systems involves particularly higher risks of deficiencies or disruptions than the continued use of systems which have had a longer history of use and observed performance in the Company.

Because we conduct most of our business internationally, we are subject to operational, economic, financial and political risks abroad.

Sales of our products to customers outside of the United States represent a significant part of our past and anticipated revenues. Our international sales as a percentage of our revenues were 82%, 74% and 75% for fiscal 2020, 2019 and 2018, respectively. Certain of our non-U.S. based customers also purchase through their subsidiaries in the United States. In the future, we expect international sales, to continue to account for a significant percentage of our revenues. Accordingly, we will be subject to risks and challenges that we would not otherwise face if we conducted our business solely in the United States.

These risks and challenges include:

- compliance with a wide variety of foreign laws and regulations;
- legal uncertainties regarding taxes, tariffs, quotas, export controls, export licenses and other trade barriers;
- political and economic instability or foreign conflicts, including trade wars, that involve or affect the countries of our customers;
- difficulties in collecting accounts receivable and longer accounts receivable payment cycles;
- difficulties in staffing and managing personnel, distributors and representatives;
- reduced protection for intellectual property rights in some countries;
- currency exchange rate fluctuations, which could affect the value of our assets denominated in local currency, as well as the price of our products relative to locally produced products;
- the impact of pandemics or other disruptions to trade and production;
- seasonal fluctuations in purchasing patterns in other countries; and
- fluctuations in freight rates and transportation disruptions.

Any of these factors could harm our existing international operations, impair our ability to continue expanding into international markets or materially adversely affect our operating results. Political developments in the United States and elsewhere may increase the risks and uncertainties associated with conducting international business, including the possibilities of greater tariffs and other trade barriers in the regions where we conduct business. In fiscal 2020, we observed a continuing trend of increasing risks and challenges in the conduct of our international business activities, including expanded tariffs and other trade barriers affecting the United States and China. Additionally, we are required to comply with foreign import and export requirements, customs and value added tax standards that can be unclear or complex. Our failure to meet these requirements and standards could negatively impact our business operations.

Our foreign operations expose us to additional risks relating to currency fluctuations.
Our international operations are significant to our revenues and net income, and we plan to continue to grow internationally. We have significant business operations located in Germany. While we report our financial results in U.S. dollars, we incur certain costs in other currencies, and have certain foreign currency denominated assets and liabilities. We, therefore, face exposure to fluctuations in currency exchange rates. Significant fluctuations in exchange rates between the U.S. dollar and foreign currencies may adversely affect our revenues and earnings, despite our hedging of a portion of our international currency exposures. Additionally, hedging programs are inherently risky and could expose us to additional costs and risks that could adversely affect our financial condition and results of operations.

Increasingly restrictive export regulations and other trade barriers may materially harm our business.
Sales of our products to customers outside of the United States represent a significant part of our past and anticipated revenues, including sales involving exports from the United States to China. There is a continuing trend of increasing trade barriers affecting exports and imports between the United States and China. For example, the U.S. Department of Commerce, Bureau of Industry and Security (BIS), has recently amended the U.S. Export Administration Regulations to expand license requirements on exports to entities in China that may support military end uses. These rules expand export license requirements on a broader set of items from the U.S., including many of our products and for a broader set of customers in China and elsewhere. The BIS has also broadened the application of U.S. export controls to items which are the foreign direct products of the U.S. technologies which can affect a variety of customers outside of China who supplier products to certain entities in China. There is no assurance that we will obtain any export licenses on a timely basis or at all. There also remains considerable uncertainty regarding the interpretation and implementation of new regulations. In addition, the reaction to these rules by governments and private businesses outside the U.S., particularly in China, may be expected to include retaliatory controls and preferences for non-U.S. or local suppliers. In China we are already observing stronger preferences for non-U.S. suppliers in general, and in favor of new and existing local suppliers in particular. These and other regulatory and policy changes, and the reactions of customers to such changes, in the U.S. and elsewhere could materially and negatively affect our future sales and operating results.

If we fail to protect our proprietary rights, our competitors might gain access to our technology, which could adversely affect our ability to compete successfully in our markets.
If we choose not to protect our proprietary rights or fail in our efforts to protect our proprietary rights, our competitors might gain access to our technology. Unauthorized parties might attempt to copy aspects of our products or to obtain and use information that we regard as proprietary. Others might independently develop similar or competing technologies or methods or design around our patents. In addition, the laws of many foreign countries in which we or our customers do business do not protect our intellectual property rights to the same extent as the laws of the United States. As a result, our proprietary rights could be compromised, our competitors might offer products similar to ours and we might not be able to compete successfully. We also cannot assure that:

- our means of protecting our proprietary rights will be adequate;
- patents will be issued from our pending or future applications;
- our existing or future patents will be sufficient in scope or strength to provide any meaningful protection or commercial advantage to us;
- our patents or other intellectual property will not be invalidated, circumvented or successfully challenged in the United States or foreign countries; or
- others will not misappropriate our proprietary technologies or independently develop similar technologies, duplicate our products or design around any of our patents or other intellectual property, or attempt to manufacture and sell infringing products in countries that do not strongly enforce intellectual property rights.

We have spent and may be required to spend in the future, significant resources to monitor and protect our intellectual property rights. Any litigation, whether or not resolved in our favor, and whether initiated by us or by a third party, could result in significant and possibly material expenses to us and divert the efforts of our management and technical personnel.

We might be subject to claims of infringement of other parties' proprietary rights.
Our industry is characterized by uncertain and conflicting intellectual property claims. As we have in the past, we may receive claims that we are infringing intellectual property rights of others. The resolution of intellectual property claims, with or without merit, could be time consuming, result in costly litigation with highly uncertain outcomes, or impact our delivery of products. In the event of an adverse judgement or settlement, we might be required to pay substantial amounts, cease the use or sale of infringing products, spend significant resources to develop non-infringing technology, discontinue the use of certain technology or enter into license agreements. License agreements might not be available on terms acceptable to us or at all. In addition, certain of our customer contracts contain provisions that require us to defend or indemnify our customers for third party intellectual property infringement claims, which could increase the costs and negative impacts of intellectual property claims.

We have recorded restructuring, inventory write-offs and asset impairment charges in the past and may do so again in the future, which could have a material negative impact on our business.
We recorded restructuring charges in fiscal 2019 and 2018. We may implement restructuring plans in the future, which would require us to take additional, potentially material, restructuring charges related to employee terminations, asset disposal or exit costs. We may also be required to write off additional inventory if our product build plans or usage of inventory experience declines, and such additional write-offs could constitute material charges. In addition, significant adverse changes in market conditions could require us to take additional material impairment charges related to our long-lived assets if the changes impact the critical assumptions or estimates that we use in our assessment of the recoverability of our long-lived assets. Any such additional charges, whether related to restructuring, asset impairment or factory underutilization may have a material negative impact on our operating results and related financial statements.

We may not be able to recruit or retain qualified personnel.
We believe our ability to manage successfully and grow our business and to develop new products depends, in large part, on our ability to recruit and retain qualified employees, particularly highly skilled technical, sales, management, and key staff personnel. Competition for qualified resources is intense and other companies may have greater resources available to provide substantial inducements to lure key personnel away from us or to offer more competitive compensation packages to individuals we are trying to hire.

Our failure to comply with environmental laws and regulations could subject us to significant fines and liabilities, and new laws and regulations or changes in regulatory interpretation or enforcement could make compliance more difficult and costly.
We are subject to various U.S. federal, state and local, and foreign governmental laws and regulations relating to the protection of the environment, including those governing the discharge of pollutants into the air and water, the management and disposal of hazardous substances and wastes, the cleanup of contaminated sites and the maintenance of a safe workplace. We could incur substantial costs, including cleanup costs, civil or criminal fines or sanctions and third-party claims for property damage or personal injury, as a result of violations of or liabilities under environmental laws and regulations or non-compliance with the environmental permits required at our facilities.

Environmental laws, regulations and permits could require the installation of costly pollution or waste control equipment or operational changes to limit waste or emissions or decrease the likelihood of accidental releases of hazardous substances. In addition, changing laws and regulations, new laws and regulations, stricter enforcement of existing laws and regulations, the discovery of previously unknown contamination at our or others' sites or the imposition of new cleanup requirements could require us to curtail our operations, restrict our future expansion, subject us to liability and cause us to incur future costs that could harm our operations, thereby adversely impacting our operating results and cash flow.

Risks Relating to Our Acquisitions

We have made acquisitions, and may make additional acquisitions or investments in the future, which could put a strain on our resources, cause ownership dilution to our stockholders or adversely affect our financial results.
Our acquisitions or investments may subject us to new or heightened risks. Integrating any newly acquired businesses, products or technologies into our company draws upon on our resources in ways that can be expensive and time consuming. These activities can substantially affect our financial resources, could cause delays in product delivery and might not be successful. Acquisitions and investments can divert management's attention and expose our business to new liabilities or risks associated with entering into new business activities. In addition, we might lose key employees while integrating new organizations. We might not be successful in integrating any acquired businesses, products or technologies, and might not achieve anticipated revenues and cost benefits. Investments that we make may not result in a return consistent with our projections upon which such investments are made, or may require additional investment that we did not originally anticipate. In addition, acquisitions can result in customer dissatisfaction, performance problems with an acquired company, potentially dilutive issuances of equity

securities or the incurrence of debt and restrictive debt covenants, contingent liabilities, possible impairment charges related to goodwill or other intangible assets or other adverse impacts or circumstances. If any of these risks were to come about, our business, financial results and stock price could be materially and adversely affected.

If goodwill or other intangible assets that we recorded, or will record, in connection with our acquisitions become impaired, we could be required to take significant charges against earnings.

In connection with our accounting for acquired businesses, we record a significant amount of goodwill and other intangible assets. Under U.S. generally accepted accounting principles, or GAAP, we must assess, at least annually and potentially more frequently, whether the value of goodwill and other indefinite-lived intangible assets have been impaired. Finite-lived intangible assets are assessed for impairment in the event of an impairment indicator. Any reduction or impairment of the value of goodwill or other intangible assets will result in a charge against earnings, which could materially adversely affect our results of operations and stockholders' equity in future periods.

Risks Relating to Owning Our Stock

If we fail to maintain an effective system of internal and disclosure controls and procedures, we may not be able to accurately report our financial results or prevent fraud.

Effective internal and disclosure controls and procedures are necessary for us to provide reliable financial reports, to prevent fraud and to operate successfully as a public company. If we cannot provide reliable financial reports or prevent fraud, our business and reputation may be harmed. We regularly review and assess our internal controls over financial reporting and our disclosure controls and procedures. As part of that process, we may discover material weaknesses in our internal controls.

In addition, we are actively implementing new electronic data systems relating to substantial parts of our business, operations and accounting. The process of implementing and commencing our reliance on these new systems involves particularly higher risks of deficiencies or disruptions in relation to our internal controls and disclosure controls and procedures than the continued use of systems which have had a longer history of use and observed performance in the Company.

If we fail to maintain effective controls or timely effect any necessary improvement of our internal and disclosure controls, we may not have accurate information to make management decisions, our operating results could be harmed or we may fail to meet our reporting obligations. Ineffective internal and disclosure controls could also cause stockholders to lose confidence in our reported financial information and our ability to manage our business, which would likely have a negative effect on the trading price of our securities.

The trading price of our common stock has been and is likely to continue to be volatile, and you might not be able to sell your shares at or above the price that you paid for them.

The trading prices of the securities of technology companies have been highly volatile. During fiscal 2020, our stock price (Nasdaq Global Market close price) ranged from $16.66 per share to $45.20 per share. The trading price of our common stock is likely to continue to be subject to wide fluctuations. Factors affecting the trading price of our common stock could include:

- variations in our operating results;
- our forecasts and financial guidance for future periods;
- announcements of technological innovations, new products or product enhancements, new product adoptions at semiconductor customers or significant agreements by us or by our competitors;
- reports regarding our ability to bring new products into volume production efficiently;
- the gain or loss of significant orders or customers;
- changes in the estimates of our operating results or changes in recommendations by any securities analysts that elect to follow our common stock;
- rulings on litigation and proceedings;
- seasonality, principally due to our customers' purchasing cycles;
- market and competitive conditions in our industry, the entire semiconductor industry and the economy as a whole;
- recruitment or departure of key personnel; and
- announcements of mergers and acquisition transactions and the ability to successfully integrate the business activities of the acquired/merged company; and
- political and global economic instability, including as a result of trade barriers, natural disasters, epidemics and pandemics (such as the current COVID-19 pandemic), military conflicts, climate change, and other factors acting alone or in combination.

In addition, if the market for technology stocks or the stock market in general experiences loss of investor confidence, the trading price of our common stock could decline for reasons unrelated to our business, operating results or financial condition. The trading price of our common stock also might decline in reaction to events that affect other companies in our industry even if these events do not directly affect us.

Provisions of our certificate of incorporation and bylaws or Delaware law might discourage, delay or prevent a change of control of our company or changes in our management and, therefore, depress the trading price of our common stock.
Delaware corporate law and our certificate of incorporation and bylaws contain provisions that could discourage, delay or prevent a change in control of our company or changes in our management that the stockholders of our company may deem advantageous. These provisions:

- establish a classified board of directors so that not all members of our board are elected at one time;
- provide that directors may only be removed “for cause” and only with the approval of 66.7% of our stockholders;
- require super-majority voting to amend some provisions in our certificate of incorporation and bylaws;
- authorize the issuance of “blank check” preferred stock that our board could issue to increase the number of outstanding shares and to discourage a takeover attempt;
- limit the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- provide that the board of directors is expressly authorized to make, alter or repeal our bylaws; and
- establish advance notice requirements for nominations for election to our board or for proposing matters that can be acted upon by stockholders at stockholder meetings.

In addition, Section 203 of the Delaware General Corporation Law may discourage, delay or prevent a change in control of our company. In addition, each of our named executive officers and certain other executives of the company have entered into change of control severance agreements, which were approved by our Compensation Committee, which could increase the costs associated with a change of control and thus, potentially deter such a transaction.

Item 1B: ***Unresolved Staff Comments***

None.

Item 2: ***Properties***

Our corporate headquarters, which includes sales, marketing, administration, manufacturing, engineering, and research and development facilities, is located in Livermore, California, United States. Our corporate headquarters comprises a campus of five buildings totaling approximately 259,000 square feet. We presently lease four of the buildings and own one of the buildings. In addition, we lease office, repair and service, manufacturing and/or research and development space both inside and outside of the United States. The leases expire at various times through 2028. We believe that our existing and planned facilities are suitable for our current needs.

Information concerning our properties as of December 26, 2020 is set forth below:

Location	Principal Use	Square Footage	Ownership
Livermore, California, United States	Corporate headquarters, sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	168,636	Leased
Livermore, California, United States	Manufacturing	90,508	Owned
Beaverton, Oregon, United States	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	98,946	Leased
Carlsbad, California, United States	Sales, product design, administration, manufacturing, service and repair, distribution, research and development	30,876	Leased
San Jose, California, United States	Administration, product design, manufacturing, service and repair, distribution, research and development	24,758	Leased
Baldwin Park, California, United States	Manufacturing	26,000	Leased
Boulder, Colorado, United States	Manufacturing, distribution, research and development	34,133	Leased
Thiendorf, Germany	Sales, marketing, administration, manufacturing, service and repair, distribution, research and development	54,361	Leased
Munich, Germany	Sales, manufacturing, service and repair, distribution, research and development	10,656	Leased
Dresden, Germany	Sales and service	2,960	Leased
Bergisch Gladbach, Germany	Manufacturing, service and repair, distribution, research and development	12,235	Leased
Singapore	Sales, administration, product design, service, and field service	24,413	Leased
Jubei City, Hsinchu, Taiwan	Sales, administration, product design, field service and repair center	18,568	Leased
Bundang, South Korea	Sales, administration, product design, field service, and repair center	17,161	Leased
Yokohama City, Japan	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	13,309	Leased
Hiroshima, Japan	Repair center	1,007	Leased
Suzhou, China	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	15,177	Leased
Shanghai, China	Sales and service	3,348	Leased
Montbonnot Saint Martin, France	Sales and service	4,736	Leased
Legnano, Italy	Sales office	215	Leased

Item 3: ***Legal Proceedings***

From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. As of December 26, 2020, and as of the filing of this Annual Report on Form 10-K, we were not involved in any material legal proceedings. In the future, we may become a party to additional legal proceedings that may require us to spend significant resources, including proceedings designed to protect our intellectual property rights. Litigation can be expensive and disruptive to normal business operations. Moreover, the results of legal proceedings are difficult to predict, and the costs incurred in litigation can be substantial, regardless of outcome.

Item 4: ***Mine Safety Disclosures***

Not applicable.

PART II

Item 5: ***Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities***

Market Information

Our common stock is listed on the Nasdaq Global Market under the symbol "FORM." As of February 16, 2021, there were 142 registered holders of record of our common stock.

Dividends

No cash dividends have been declared on shares of our common stock, and the Company currently does not intend to pay dividends in the future.

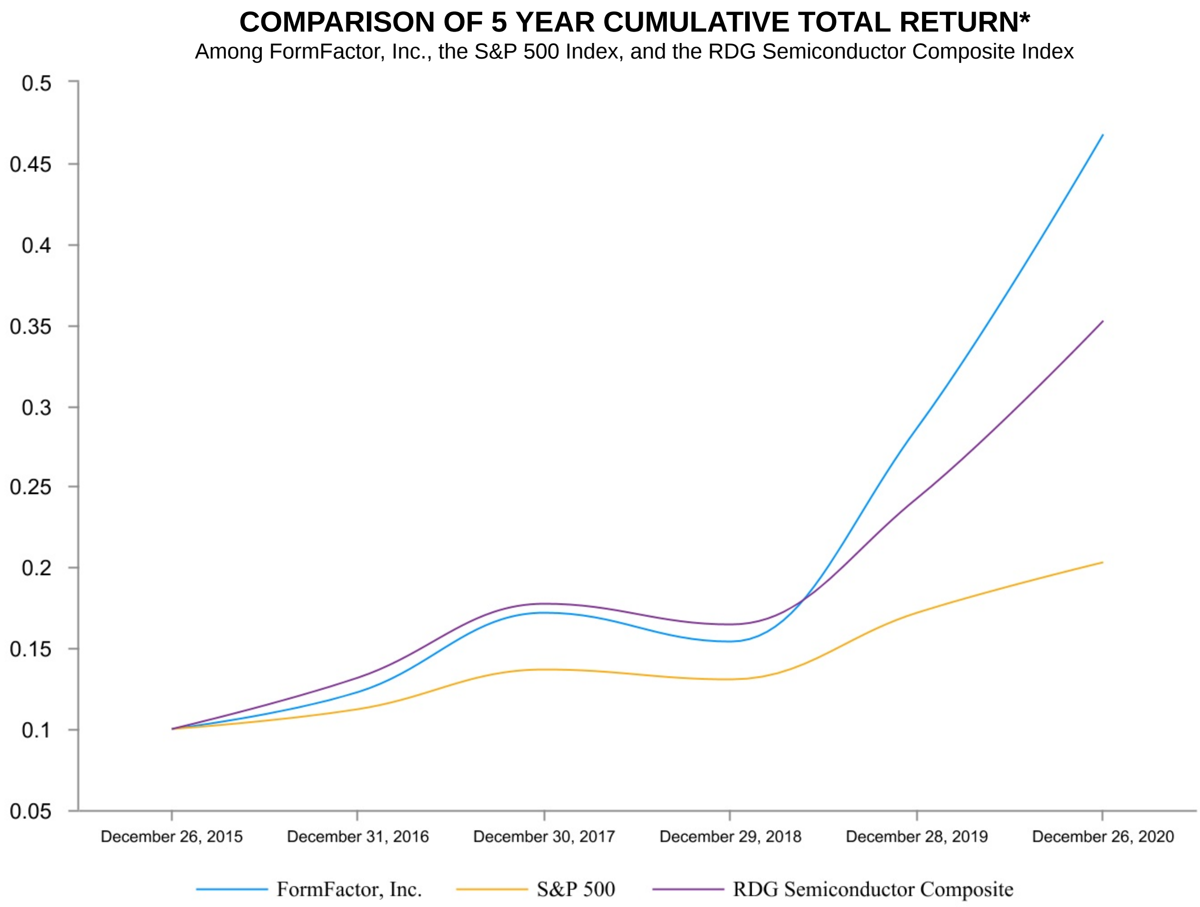
Repurchase of Common Stock

In October 2020, our Board of Directors authorized a program to repurchase up to $50.0 million of outstanding common stock to offset potential dilution from issuances of common stock under our employee stock purchase plan and equity incentive plan. The share repurchase program will expire on October 28, 2022.

During fiscal 2020, 2019, and 2018, we did not repurchase any shares.

Stock Price Performance Graph

The following graph shows the total stockholder return of an investment of $100 in cash on December 26, 2015 through December 26, 2020 for (1) our common stock, (2) the S&P 500 Index and (3) the RDG Semiconductor Composite Index. All values assume reinvestment of the full amount of all dividends. Stockholder returns over the indicated period are based on historical data and are not necessarily indicative of future stockholder returns.



*$100 invested on December 26, 2015 in stock or index, including reinvestment of dividends.

	Cumulative Total Return					
	December 26, 2015	December 31, 2016	December 30, 2017	December 29, 2018	December 28, 2019	December 26, 2020
FormFactor, Inc.	$ 100.00	$ 122.94	$ 171.79	$ 153.79	$ 285.84	$ 467.40
S&P 500	100.00	111.96	136.40	130.42	171.49	203.04
RDG Semiconductor Composite	100.00	131.64	177.48	164.63	242.61	351.91

Item 7: *Management's Discussion and Analysis of Financial Condition and Results of Operations*

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes included elsewhere in this Annual Report on Form 10-K. In addition to historical consolidated financial information, the following discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions as described under the "Note Regarding Forward-Looking Statements" that appears earlier in this Annual Report on Form 10-K. Our actual results could differ materially from those anticipated by these forward-looking statements as a result of many factors, including those discussed under "Item 1A: Risk Factors" and elsewhere in this Annual Report on Form 10-K.

Overview

FormFactor, Inc., headquartered in Livermore, California, is a leading provider of test and measurement solutions. We provide a broad range of high-performance probe cards, analytical probes, probe stations, metrology systems, thermal systems, and cryogenic systems to both semiconductor companies and scientific institutions. Our products provide electrical and optical information from a variety of semiconductor and electro-optical devices and integrated circuits from research, through development to production. Customers use our products and services to lower production costs, improve yields, and enable development of their complex next-generation products.

We operate in two reportable segments consisting of the Probe Cards segment and the Systems segment. Sales of our probe cards and analytical probes are included in the Probe Cards segment, while sales of our probe stations, metrology systems, thermal systems and cryogenic systems are included in the Systems segment.

We generated net income of $78.5 million in fiscal 2020 compared to net income of $39.3 million in fiscal 2019 and net income of $104.0 million in fiscal 2018. The increase in net income in fiscal 2020 compared to fiscal 2019 was primarily due to increased revenue and leverage on operating expenses, which only marginally increased on significantly higher operating levels, as well as a decrease in provision for income taxes due to a lower effective tax rate in 2020. The decrease in net income in fiscal 2019 compared to fiscal 2018 was primarily due to a $75.8 million income tax benefit recognized in fiscal 2018 related to the release of valuation allowances against certain U.S. deferred tax assets and the increase in provision for income taxes due to the recognition of deferred tax expense.

Impact of COVID-19

The COVID-19 pandemic continues to cause serious illness and death in many of the regions that we, our customers and our suppliers operate. The COVID-19 pandemic has resulted in significant governmental actions designed to control the spread of the virus, including the imposition of safety requirements and other orders in locations where we have manufacturing and other activities. We have maintained social distancing, contact tracing, and various other measures to enable our manufacturing sites to continue efficient production.

We believe that we operate in a critical infrastructure industry, as defined by the U.S. Department of Homeland Security. This reduces the current and anticipated impacts of the COVID-19 pandemic on our major customers and suppliers, and upon our operations, as compared to companies that are not part of the critical infrastructure. We currently continue to operate in all of our manufacturing sites at production levels comparable to those prior to the pandemic, albeit subject to certain safety and related constraints. Our other operations are similarly continuing with substantial work-from-home activities.

If the provisions of governmental health orders or other safety requirements applicable to us or our customers or suppliers become more restrictive for an extended period of time, or if we have repeated occurrences of COVID-19 in any of our facilities, we may experience disruptions or delays in manufacturing, product design, product development, customer support, manufacturing and sales, and an overall loss of productivity and efficiency.

Even with our continued operations, COVID-19 has had, and may have further, negative impacts on our supply chain, workforce and customers. The continued progression of the COVID-19 pandemic and associated macro-economic, trade-related, and site-specific restrictions, including but not limited to the effects of any overall global, regional or national economic slowdowns or other economic downturns, increased trade and transport costs, and inability to access customer sites for certain activities could also negatively impact our business or results of operations.

As the COVID-19 pandemic is a widespread public health crisis, it is adversely affecting major economies and financial markets world-wide. A resulting economic downturn can be expected to eventually negatively affect the demand for our products, and contribute to volatile demand and supply conditions affecting the markets for our products.

Governments in several countries where we operate, including the United States, have enacted stabilization and stimulus measures in an effort to counteract some of the impacts of COVID-19. We have benefited and may continue to benefit from some of these measures directly or indirectly, although we do not believe those benefits have had or will have a material effect upon our financial results or financial condition. Governments may discontinue, amend, replace or otherwise change or supplement such stabilization and stimulus measures in ways that are difficult to predict, and it is possible that such changes could have a material effect upon our financial results or financial condition, or the financial results or financial condition of our customers or suppliers.

While to date the disruptions in our operations, supply chain and customer demand as a result of the COVID-19 pandemic have been somewhat limited, we believe that the COVID-19 pandemic represents a sustained threat that may give rise to a variety of more significant adverse impacts on our business and financial results. We consider this as a near or longer term trend, although we cannot identify or quantify the specific impacts given current levels of uncertainty and the broad variety of effects that may arise from a pandemic of this magnitude. For a further description of the uncertainties and business risks associated with the COVID-19 pandemic, see Part I, Item 1A, "*Risk Factors"* in this Annual Report on Form 10-K.

Fiscal Year

We operate on a 52/53 week fiscal year, whereby the fiscal year ends on the last Saturday of December. The fiscal years ended December 26, 2020, December 28, 2019 and December 29, 2018 each included 52 weeks.

Use of Estimates

Preparation of our financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses. Management bases its estimates on historical experience and on various other assumptions that it believes to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Critical Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with generally accepted accounting principles ("GAAP"). The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of net revenue and expenses in the reporting period. Our accounting policies are fundamental to understanding our financial condition and results of operations reported in our financial statements and related disclosures. We have identified the following accounting policies as being critical because they require our management to make particularly difficult, subjective and/or complex judgments about the effect of matters that are inherently uncertain. Our management has discussed the development, selection, application and disclosure of these critical accounting policies with the Audit Committee of our Board of Directors.

Inventory Valuation

We state our inventories at the lower of cost (principally standard cost which approximates actual cost on a first in, first out basis) or net realizable value. We continually assess the value of our inventory and will periodically write down its value for estimated excess inventory and product obsolescence based upon an analysis of existing inventory quantities compared to estimated future consumption. Future consumption is estimated based upon assumptions about how past consumption, recent purchases, backlog and other factors indicate future consumption. On a quarterly basis, we review existing inventory quantities in comparison to our past consumption, recent purchases, backlog and other factors to determine what inventory quantities, if any, may not be sellable. Based on this analysis, we record an adjustment to the cost basis of inventory when evidence exists that the net realizable value of inventory is lower than its cost, which occurs when we have excess and/or obsolete inventory.

At the point of loss recognition, a new, lower cost basis for that inventory is established, and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis. Market conditions are subject to change, and demand for our products can fluctuate significantly. Actual consumption of inventories could differ from forecasted demand, and this difference could have a material impact on our gross profit and inventory balances based on additional provisions for excess or obsolete inventories or a benefit from the sale of inventories previously written down.

Revenue Recognition

We recognize revenue upon transferring control of products and services, and the amounts recognized reflect the consideration we expect to be entitled to receive in exchange for these products and services. An arrangement may include some or all of the following products and services: probe cards, systems, accessories, installation services, service contracts and extended warranty contracts.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer. In contracts with multiple performance obligations, we identify each performance obligation and evaluate whether the performance obligation is distinct within the context of the contract at contract inception. Performance obligations that are not distinct at contract inception are combined and accounted for as one unit. Generally, the performance obligations in a contract are considered distinct within the context of the contract and are accounted for as separate units.

Our products may be customized to our customers' specifications, however, control of our product is typically transferred to the customer at the point in time the product is either shipped or delivered, depending on the terms of the arrangement, as the criteria for over time recognition are not met. In limited circumstances, substantive acceptance by the customer exists, which results in the deferral of revenue until acceptance is formally received from the customer. Judgment may be required in determining if the acceptance clause is substantive.

Installation services are routinely provided to customers purchasing our systems. Installation services are a distinct performance obligation apart from the systems and are recognized in the period they are performed. Service contracts, which include repair and maintenance service contracts, and extended warranty contracts are also distinct performance obligations and are recognized over the contractual service period, which ranges from one to three years. For service contracts recognized over time, we use a days-elapsed input to measure progress.

A contract's transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. In determining the transaction price, we evaluate whether the price is subject to refund or adjustment to determine the net consideration to which we expect to be entitled. We generally do not grant return privileges, except for defective products during the warranty period. Sales incentives and other programs that we may make available to customers are considered to be a form of variable consideration, which is estimated in determining the contract's transaction price to be allocated to the performance obligations.

For contracts with multiple performance obligations, we allocate the contract's transaction price to each performance obligation based on its relative stand-alone selling price. The stand-alone selling prices are determined based on observable prices, which are the prices at which we separately sell the products. For items which do not have observable prices, we use our best estimate of the stand-alone selling prices.

We account for tax assessed by a governmental authority that is directly imposed on a revenue-producing transaction (i.e., sales, use, value added) on a net (excluded from revenue) basis.

Results of Operations

In this section, we discuss the results of our operations for the year ended December 26, 2020 compared to the year ended December 28, 2019. For a discussion of the year ended December 28, 2019 compared to the year ended December 29, 2018, please refer to Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the year ended December 28, 2019.

The following table sets forth our operating results as a percentage of revenues:

	Fiscal 2020	Fiscal 2019	Fiscal 2018
Revenues	100.0 %	100.0 %	100.0 %
Cost of revenues	58.5	59.7	60.3
Gross profit	41.5	40.3	39.7
Operating expenses:			
Research and development	12.8	13.8	14.2
Selling, general and administrative	16.6	18.0	18.7
Total operating expenses	29.4	31.8	32.9
Operating income	12.1	8.5	6.8
Interest income	0.2	0.5	0.3
Interest expense	(0.1)	(0.3)	(0.6)
Other income (expense), net	0.1	*	*
Income before income taxes	12.3	8.7	6.5
Provision (benefit) for income taxes	1.0	2.0	(13.2)
Net income	11.3 %	6.7 %	19.7 %

* Amounts insignificant and not greater than 0.1%.

Revenues by Segment

	Fiscal 2020	Fiscal 2019	Fiscal 2018
		(In thousands)	
Probe Cards	$ 581,739	$ 491,363	$ 434,269
Systems	111,877	98,101	95,406
Total	$ 693,616	$ 589,464	$ 529,675

Revenues by Market

	Fiscal 2020	% of Revenues	Fiscal 2019	% of Revenues	Change $	Change %
			(In thousands, except percentages)			
Probe Cards Markets:						
Foundry & Logic	$ 446,183	64.3 %	$ 318,552	54.0 %	$ 127,631	40.1 %
DRAM	109,734	15.8	147,257	25.0	(37,523)	(25.5)
Flash	25,822	3.7	25,554	4.3	268	1.0
Systems Market:						
Systems	111,877	16.2	98,101	16.7	13,776	14.0
Total revenues	$ 693,616	100.0 %	$ 589,464	100.0 %	$ 104,152	17.7 %

	Fiscal 2019	% of Revenues	Fiscal 2018	% of Revenues	Change $	Change %
			(In thousands, except percentages)			
Probe Cards Markets:						
Foundry & Logic	$ 318,552	54.0 %	$ 258,459	48.8 %	$ 60,093	23.3 %
DRAM	147,257	25.0	135,333	25.6	11,924	8.8
Flash	25,554	4.3	40,477	7.6	(14,923)	(36.9)
Systems Market:						
Systems	98,101	16.7	95,406	18.0	2,695	2.8
Total revenues	$ 589,464	100.0 %	$ 529,675	100.0 %	$ 59,789	11.3 %

The increase in Foundry & Logic product revenue in fiscal 2020 compared to fiscal 2019 was driven principally by increased unit sales to large semiconductor foundries and integrated device manufacturers, demonstrating success in diversifying across our strategic accounts. Additionally, sales have increased due to the demand for 5G handsets and devices and infrastructure spending to support working from home and distance learning.

The decrease in DRAM product revenues in fiscal 2020 compared to fiscal 2019 was driven by a decreased customer demand as a result of the absorption of large purchases in fiscal 2019.

Flash product revenue stayed relatively flat in fiscal 2020 compared to fiscal 2019 driven by the acquisition of Baldwin Park. This offset what would have otherwise been a decrease in demand. Our revenue in this market continues to be highly variable.

The increase in Systems product revenue in fiscal 2020 compared to fiscal 2019 was driven by additional revenue from the acquisitions of FRT and HPD and increased sales of probe stations, partially offset by lower revenue from thermal systems.

Due to COVID-19, there were various impacts across our segments due to governmental mandates of social distancing. This resulted in a temporary factory shutdown in certain locations for almost two weeks during our first fiscal quarter of 2020, limiting our manufacturing capacity. We believe these shutdowns and governmental mandates negatively affected revenue and impacted our ability to maintain typical lead times throughout fiscal 2020, especially in our Probe Cards segment.

Revenues by Geographic Region

	Fiscal 2020	% of Revenues	Fiscal 2019	% of Revenues	Fiscal 2018	% of Revenues
			(In thousands, except percentages)			
China	$ 174,915	25.2 %	$ 106,256	18.0 %	$ 77,851	14.7 %
Taiwan	150,837	21.7	86,539	14.7	107,476	20.3
United States	127,628	18.4	155,202	26.3	133,648	25.2
South Korea	86,951	12.5	116,882	19.8	91,247	17.2
Europe	65,572	9.5	41,473	7.0	39,671	7.5
Japan	43,605	6.3	52,584	8.9	49,814	9.4
Asia-Pacific (1)	32,991	4.8	21,468	3.7	25,980	4.9
Rest of World	11,117	1.6	9,060	1.6	3,988	0.8
Total Revenues	$ 693,616	100.0 %	$ 589,464	100.0 %	$ 529,675	100.0 %

(1) Asia-Pacific includes all countries in the region except Taiwan, South Korea, China and Japan, which are disclosed separately.

Geographic revenue information is based on the location to which we ship the product. For example, if a certain South Korean customer purchases through their U.S. subsidiary and requests the products to be shipped to an address in South Korea, this sale will be reflected in the revenue for South Korea rather than U.S.

Changes in revenue by geographic region in fiscal 2020 compared to fiscal 2019 were primarily attributable to changes in customer demand, shifts in customer regional manufacturing strategies, particularly with our large multinational customers, for example the increase in China in fiscal 2020, and product sales mix.

Cost of Revenues and Gross Margins

Cost of revenues consists primarily of manufacturing materials, compensation and benefits, shipping and handling costs, manufacturing-related overhead and amortization of certain intangible assets. Our manufacturing operations rely on a limited number of suppliers to provide key components and materials for our products, some of which are a sole source. We order materials and supplies based on backlog and forecasted customer orders. Tooling and setup costs related to changing manufacturing lots at our suppliers are also included in the cost of revenues. We expense all warranty costs, inventory provisions and amortization of certain intangible assets as cost of revenues.

Gross profit and gross margin by segment were as follows (dollars in thousands):

	Fiscal 2020			
	Probe Cards	Systems	Corporate and Other	Total
Gross profit	$ 263,215	$ 51,835	$ (27,130)	$ 287,920
Gross margin	45.2 %	46.3 %	— %	41.5 %

	Fiscal 2019			
	Probe Cards	Systems	Corporate and Other	Total
Gross profit	$ 211,382	$ 50,927	$ (24,813)	$ 237,496
Gross margin	43.0 %	51.9 %	— %	40.3 %

	Fiscal 2018			
	Probe Cards	Systems	Corporate and Other	Total
Gross profit	$ 187,320	$ 47,074	$ (24,055)	$ 210,339
Gross margin	43.1 %	49.3 %	— %	39.7 %

Probe Cards

Gross profit and gross margin in the Probe Cards segment increased in fiscal 2020 compared to fiscal 2019, primarily due to increased sales, higher factory utilization, and product mix.

Systems

Gross profit and gross margin in the Systems segment decreased in fiscal 2020 compared to fiscal 2019, primarily as a result of less favorable product mix.

Corporate and Other

Corporate and Other includes unallocated expenses relating to amortization of intangible assets, inventory and fixed asset fair value adjustments due to acquisitions, share-based compensation, and restructuring charges, net, which are not used in evaluating the results of, or in allocating resources to, our reportable segments.

Overall

Gross profit and gross margin fluctuate with revenue levels, product mix, selling prices, factory loading and material costs. For fiscal 2020 compared to fiscal 2019, gross profit increased due to increased sales while gross margins increased by only 1.2% with fluctuations in product mix.

Stock-based compensation expense included in gross profit for fiscal 2020 and 2019 was $4.0 million and $4.1 million, respectively.

Research and Development

	Fiscal Year Ended			
	December 26, 2020	December 28, 2019	$ Change	% Change
	(Dollars in thousands)			
Research and development	$ 89,034	$ 81,499	$ 7,535	9.2 %
% of revenues	12.8 %	13.8 %		

	Fiscal Year Ended			
	December 28, 2019	December 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Research and development	$ 81,499	$ 74,976	$ 6,523	8.7 %
% of revenues	13.8 %	14.2 %		

The increase in research and development expenses in fiscal 2020 compared to fiscal 2019 was primarily driven by an increase in employee compensation costs caused by increases in headcount combined with higher variable performance-based compensation, a full year of expenses for FRT, which was acquired in the last quarter of fiscal 2019, as well as incremental expenses from newly acquired Baldwin Park, acquired in the third quarter of fiscal 2020, and HPD, acquired in the fourth quarter of fiscal 2020. There was also an increase in project material costs. The components of this increase were as follows (in thousands):

	Fiscal 2020 compared to Fiscal 2019
Employee compensation costs	$ 7,128
Project material costs	1,152
Depreciation	245
General operating expenses	(447)
Stock-based compensation	(543)
	$ 7,535

Stock-based compensation expense included within research and development in fiscal 2020 and 2019 was $5.8 million and $6.4 million, respectively.

Selling, General and Administrative

	Fiscal Year Ended			
	December 26, 2020	December 28, 2019	$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	$ 115,098	$ 106,335	$ 8,763	8.2 %
% of revenues	16.6 %	18.0 %		

	Fiscal Year Ended			
	December 28, 2019	December 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	$ 106,335	$ 99,254	$ 7,081	7.1 %
% of revenues	18.0 %	18.7 %		

The increase in selling, general and administrative in fiscal 2020 compared to fiscal 2019 was primarily due to an increase in variable costs with the increased sales volumes, increase in headcount with recent acquisitions, higher variable performance based compensation, higher consulting fees primarily related to information technology security remediation costs, partially offset by a gain on contingent consideration related to the acquisition of FRT, decreased travel due to travel restrictions, and decreased amortization of intangibles as certain intangibles recognized in the acquisition of MicroProbe and Cascade Microtech reached the end of their useful lives, which was only partially offset by the additions of intangibles arising from the more recent acquisitions for FRT, Baldwin Park, and HPD.

The components of this overall increase were as follows (in thousands):

	Fiscal 2020 compared to Fiscal 2019
Employee compensation	$ 10,417
Consulting fees	3,580
Stock-based compensation	1,302
Amortization of intangibles	(1,254)
Gain on contingent consideration	(2,879)
Travel related costs	(3,576)
General operating expenses	1,173
	$ 8,763

Stock-based compensation expense included within selling, general and administrative in fiscal 2020 and 2019 was $14.1 million, and $12.8 million, respectively.

Interest Income and Interest Expense

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
		(Dollars in thousands)	
Interest income	$ 1,501	$ 2,714	$ 1,356
Weighted average balance of cash and investments	$ 230,310	$ 179,526	$ 138,467
Weighted average yield on cash and investments	0.90 %	2.05 %	1.51 %
Interest expense	$ 864	$ 1,915	$ 3,314
Average debt outstanding	$ 37,563	$ 56,776	$ 90,086
Weighted average interest rate on debt	1.94 %	4.09 %	3.98 %

Interest income is earned on our cash, cash equivalents, restricted cash and marketable securities. The decrease in interest income in fiscal 2020 compared to fiscal 2019 was attributable to lower investment yields due to the low interest rate environment despite higher invested balances.

Interest expense primarily includes interest on our term loans, interest rate swap derivative contracts, and term loan issuance costs amortization charges. The decrease in interest expense in fiscal 2020 compared to fiscal 2019 was primarily due to lower outstanding debt balances due to the pay-off of the CMI Term Loan on June 30, 2020, partially offset by the FRT Term Loan originated in the fourth quarter of 2019 and the Building Term Loan originated in the second quarter of 2020. This activity lowers interest expense due to lower interest rates on the outstanding debt.

Other Income (Expense), Net

Other income (expense), net primarily includes the effects of foreign currency impact and various other gains and losses.

Provision (Benefit) For Income Taxes

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
		(Dollars in thousands)	
Provision (benefit) for income taxes	$ 6,652	$ 11,717	$ (70,109)
Effective tax rate	7.8 %	22.9 %	(206.6)%

Provision (benefit) for income taxes reflects the tax provision on our operations in foreign and U.S. jurisdictions, offset by tax benefits from tax credits and the foreign-derived intangible income ("FDII") deduction. On July 23, 2020, the U.S. Department of Treasury and the Internal Revenue Service finalized regulations T.D. 9902 with respect to the global intangible low-taxes income high-tax exemption, resulting in a decrease in our effective tax rate. This adjustment was retroactive to the fiscal years 2018 and 2019 and the cumulative impact is taken into account during fiscal 2020. Furthermore, the benefit derived from the FDII deduction is influenced by the relative weighting of export sales and domestic sales and when export sales are proportionally higher the expected effective tax rate is reduced due to a larger realized deduction. In addition to these impacts, the effective tax rate was impacted favorably by additional deductions for stock compensation due to increased stock prices between the grant date and vest date.

Our effective tax rate may vary from period to period based on changes in estimated taxable income or loss by jurisdiction, the relative mix of export sales and domestic sales, changes to the valuation allowance, changes to U.S. federal, state or foreign tax laws, future expansion into areas with varying country, state, and local income tax rates, deductibility of certain costs and expenses by jurisdiction.

Liquidity and Capital Resources

Capital Resources

Our working capital increased to $332.5 million at December 26, 2020 compared to $282.5 million at December 28, 2019, primarily due to higher cash and cash equivalents resulting from cash generated from operations and higher inventories and accounts receivable on higher operating levels, partially offset by higher accounts payable and accrued liabilities on higher volumes and higher deferred revenue.

Cash and cash equivalents primarily consist of deposits held at banks and money market funds. Marketable securities primarily consist of U.S. treasuries and corporate bonds. We typically invest in highly-rated securities with low probabilities of default. Our investment policy requires investments to be rated single A or better, and limits the types of acceptable investments, issuer concentration and duration of the investment.

Our cash, cash equivalents and marketable securities totaled approximately $255.0 million at December 26, 2020 compared to $220.9 million at December 28, 2019. We believe that we will be able to satisfy our working capital requirements for at least the next twelve months with the liquidity provided by our existing cash, cash equivalents, marketable securities and cash provided by operations. To the extent necessary, we may consider entering into short and long-term debt obligations, raising cash through a stock issuance, or obtaining new financing facilities, which may not be available on terms favorable to us. Our future capital requirements may vary materially from those now planned.

The COVID-19 pandemic has negatively impacted the global economy, disrupted global supply chains and created significant volatility and disruption of financial markets. An extended period of global supply chain and economic disruption could materially affect our business, results of operations, access to sources of liquidity and financial condition. As a result of the current and uncertain future impact of COVID-19, we have taken actions to preserve and improve our liquidity primarily by limiting our exposures to volatile markets and investments, as well as actively working to minimize counterparty risk, for example, by directly investing in securities where the counterparty is the U.S. Government rather than a similar investment where the counterparty is a bank.

If we are unsuccessful in maintaining or growing our revenues, maintaining or reducing our cost structure (in response to a potential reduction in demand due to an industry downturn, COVID-19, or other event), or increasing our available cash through debt or equity financings, our cash, cash equivalents and marketable securities may decline.

We utilize a variety of tax planning and financing strategies in an effort to manage our worldwide cash and deploy funds to locations where they are needed. As part of these strategies, we indefinitely reinvest a portion of our foreign earnings. Should we require additional capital in the U.S., we may elect to repatriate indefinitely-reinvested foreign funds or raise capital in the United States.

Cash Flows

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
	(Dollars in thousands)		
Net cash provided by operating activities	$ 169,256	$ 121,048	$ 68,700
Net cash used in investing activities	(98,922)	(66,352)	(21,295)
Net cash used in financing activities	(30,935)	(6,578)	(39,329)

Operating Activities

Net cash provided by operating activities in fiscal 2020 was primarily attributable to net income of $78.5 million, which included $88.9 million of net non-cash items, offset by changes in operating assets and liabilities using $1.9 million of cash as discussed in more detail below.

Accounts receivable increased $9.7 million to $107.6 million at December 26, 2020 compared to $97.9 million at December 28, 2019, as a result of higher operating levels and the acquisitions of Baldwin Park and HPD, offset by timing of customer payments and diligent management of collections.

Inventories, net, increased $16.0 million to $99.2 million at December 26, 2020 compared to $83.3 million at December 28, 2019, as a result of anticipated projected customer demand and the increased inventory due to the acquisitions of Baldwin Park and HPD, partially offset by a $13.1 million increase to our provision for excess and obsolete inventories.

Accrued liabilities increased $18.9 million to $55.3 million at December 26, 2020 compared to $36.4 million at December 28, 2019, as a result of an increase in employee performance-based compensation and benefits, increases in the contributions withheld for employee stock purchase plan, increases to accrued warranty, and the increased liabilities due to the acquisitions of FRT, Baldwin Park, and HPD.

Accounts payable increased $21.1 million to $62.0 million at December 26, 2020 compared to $40.9 million at December 28, 2019, as a result of higher volumes, timing of vendor payments and the increased accounts payable due to the acquisitions of Baldwin Park and HPD.

Investing Activities

Net cash used in investing activities in fiscal 2020 primarily related to $55.9 million of cash used in the acquisition of property, plant and equipment, including a new production facility in Livermore California, $51.9 million paid (net of cash acquired) as part of the consideration for the acquisition of Baldwin Park and HPD, and $8.7 million used for the purchase of marketable securities, net of maturities.

Financing Activities

Net cash used in financing activities in fiscal 2020 primarily related to $43.4 million of principal payments made towards the repayment of our term loans and $15.5 million related to tax withholdings associated with the net share settlements of our equity awards, offset by $18.0 million of proceeds from a term loan to fund the purchase of the building in Livermore and $10.0 million of proceeds received from issuances of common stock under our stock incentive plans.

Debt

CMI Term Loan

On June 24, 2016, we entered into a Credit Agreement (the “Credit Agreement”) with HSBC Bank USA, National Association ("HSBC"), as administrative agent, co-lead arranger, sole bookrunner and syndication agent, other lenders that may from time-to-time be a party to the Credit Agreement, and certain guarantors. Pursuant to the Credit Agreement, the lenders provided us with a senior secured term loan facility of $150 million (the “CMI Term Loan”). The proceeds of the CMI Term Loan were used to finance a portion of the purchase price paid in connection with the Cascade Microtech acquisition in fiscal 2016 and to pay related bank fees and expenses.

The CMI Term Loan bore interest at a rate equal to, at our option, (i) the applicable London Interbank Offered Rate ("LIBOR") rate plus 2.00% per annum or (ii) Base Rate (as defined in the Credit Agreement) plus 1.00% per annum. We elected to pay interest at 2.00% over the one-month LIBOR rate. Interest payments were payable in quarterly installments over a five-year period.

The principal payments on the CMI Term Loan were scheduled to be paid in equal quarterly installments that began June 30, 2016, in an annual amount equal to 5% for year one, 10% for year two, 20% for year three, 30% for year four and 35% for year five. We accelerated payments of these scheduled amounts and made the final payment on the CMI Term Loan on June 30, 2020, approximately one year before the original maturity. We are no longer subject to the terms of the Credit Agreement.

FRT Term Loan

On October 25, 2019, we entered into a euro denominated $23.4 million, three-year credit facility loan agreement (the "FRT Term Loan") with HSBC Trinkaus & Burkhardt AG, Germany, to fund the acquisition of FRT GmbH, which we acquired on October 9, 2019.

The FRT Term Loan bears interest at a rate equal to the Euro Interbank Offered Rate ("EURIBOR") plus 1.75 % per annum and will be repaid in quarterly installments of approximately $2.0 million plus interest. The interest rate at December 26, 2020 was 1.24%.

The obligations under the FRT Term Loan are fully and unconditionally guaranteed by FormFactor, Inc. The FRT Term Loan contains negative covenants customary for financing of this type, including covenants that place limitations on the incurrence of additional indebtedness, the creation of liens, the payment of dividends; dispositions; fundamental changes, including mergers and acquisitions; loans and investments; sale leasebacks; negative pledges; transactions with affiliates; changes in fiscal year; sanctions and anti-bribery laws and regulations, and modifications to charter documents in a manner materially adverse to the Lenders. The FRT Term Loan also contains affirmative covenants and representations and warranties customary for financing of this type. As of December 26, 2020, the balance outstanding pursuant to the FRT term loan was $17.1 million and we were in compliance with all covenants.

Building Term Loan

On June 22, 2020, we entered into an $18.0 million 15-year credit facility loan agreement (the “Building Term Loan”) with MUFG Union Bank, National Association ("Union Bank"). The proceeds of the Building Term Loan were used to purchase a building adjacent to our leased facilities in Livermore, California.

The Building Term Loan bears interest at a rate equal to the applicable LIBOR rate plus 1.75% per annum. Interest payments are payable in monthly installments over a fifteen-year period. The interest rate at December 26, 2020 was 1.90%.

On March 17, 2020, we entered into an interest rate swap agreement with Union Bank to hedge the interest payments on the Building Term Loan for the notional amount of $18.0 million. As future levels of LIBOR over the life of the loan are uncertain, we entered into this interest-rate swap agreement to hedge the exposure in interest rate risks associated with movement in LIBOR rates. By entering into the agreement, we convert a floating rate interest at one-month LIBOR plus 1.75% into a fixed rate interest at 2.75%. The interest rate swap also includes a 0% floor that is effective for one year from the date of the swap. As of December 26, 2020, the notional amount of the loan that is subject to this interest rate swap is $17.5 million.

The obligations under the Building Term Loan are guaranteed by a deed of trust covering certain real property and improvements and certain personal property used in connection therewith. The deed of trust creates a first priority lien or encumbrance on the property with only such exceptions as may be approved by the Union Bank in writing.

The Credit Agreement contains covenants customary for financing of this type. As of December 26, 2020, the balance outstanding pursuant to the Building Term Loan was $17.5 million and we were in compliance with all covenants under the Credit Agreement.

Stock Repurchase Program

In October 2020, our Board of Directors authorized a program to repurchase up to $50 million of outstanding common stock to offset potential dilution from issuances of common stock under our stock-based incentive plans. The share repurchase program will expire October 28, 2022. This repurchase program replaced the previous repurchase program that expired in February 2020 to purchase up to $25.0 million of outstanding common stock. During fiscal 2020, 2019 and 2018, we did not repurchase any shares.

Contractual Obligations and Commitments

The following table summarizes our significant contractual commitments to make future payments in cash under contractual obligations as of December 26, 2020 (in thousands):

	Payments Due In Fiscal Year						
	2021	2022	2023	2024	2025	2026 and thereafter	Total
Operating leases	$ 7,349	$ 6,115	$ 5,254	$ 4,903	$ 4,863	$ 12,531	$ 41,015
Term loans - principal payments	9,521	9,549	1,050	1,080	1,111	12,258	34,569
Term loans - interest payments(1)	503	377	290	271	248	1,185	2,874
Total	$ 17,373	$ 16,041	$ 6,594	$ 6,254	$ 6,222	$ 25,974	$ 78,458

(1) Represents our minimum interest payment commitments at 1.24% per annum for the FRT Term Loan and 1.90% per annum for the Building Term Loan.

The table above excludes our gross liability for unrecognized tax benefits, which totaled $32.5 million as of December 26, 2020. The timing of any payments which could result from these unrecognized tax benefits will depend upon a number of factors. Accordingly, the timing of payment cannot be estimated and has been excluded from the table above.

Off-Balance Sheet Arrangements

Historically, we have not participated in transactions that have generated relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. As of December 26, 2020, we were not involved in any off-balance sheet arrangements.

Indemnification Agreements

We have entered, and may from time to time in the ordinary course of our business enter, into contractual arrangements with third parties that include indemnification obligations. Under these contractual arrangements, we have agreed to defend, indemnify and/or hold the third party harmless from and against certain liabilities. These arrangements include indemnities in favor of customers in the event that our products or services infringe a third party's intellectual property or cause property or other indemnities in favor of our lessors in connection with facility leasehold liabilities that we may cause. In addition, we have entered into indemnification agreements with our directors and certain of our officers, and our bylaws contain indemnification obligations in favor of our directors, officers and agents. These indemnity arrangements may limit the type of the claim, the total amount that we can be required to pay in connection with the indemnification obligation and the time within which an indemnification claim can be made. The duration of the indemnification obligation may vary, and for most arrangements, survives the agreement term and is indefinite. We believe that substantially all of our indemnity arrangements provide either for limitations on the maximum potential future payments we could be obligated to make, or for limitations on the types of claims and damages we could be obligated to indemnify, or both. However, it is not possible to determine or reasonably estimate the maximum potential amount of future payments under these indemnification obligations due to the varying terms of such obligations, a lack of history of prior indemnification claims, the unique facts and circumstances involved in each particular contractual arrangement and in each potential future claim for indemnification, and the contingency of any potential liabilities upon the occurrence of events that are not reasonably determinable. We have not had any material requests for indemnification under these arrangements. We have not recorded any liabilities for these indemnification arrangements on our Consolidated Balance Sheets as of December 26, 2020 or December 28, 2019.

New Accounting Pronouncements

See Note 16, *New Accounting Pronouncements*, of Notes to Consolidated Financial Statements.

Item 7A: ***Quantitative and Qualitative Disclosures about Market Risk***

Foreign Currency Exchange Risk

We conduct certain operations in foreign currencies. We enter into currency forward exchange contracts to hedge a portion, but not all, of existing foreign currency denominated amounts. Gains and losses on these contracts are generally recognized in

Other income (expense), net in our Consolidated Statements of Income. Because the effect of movements in currency exchange rates on the currency forward exchange contracts generally offsets the related effect on the underlying items being hedged, these financial instruments are not expected to subject us to risks that would otherwise result from changes in currency exchange rates as of December 26, 2020. We do not use derivative financial instruments for trading or speculative purposes. We recognized a net loss from our foreign exchange of $0.5 million and $0.3 million, respectively in fiscal 2020 and 2018, and a net gain of $0.4 million in fiscal 2019.

Interest Rate Sensitivity

Our exposure to market risk for changes in interest rates relates primarily to our investment portfolio. We invest in a number of securities including U.S. agency discount notes, money market funds and commercial paper. We attempt to maintain the safety and preservation of our invested principal funds by limiting default risk, market risk and reinvestment risk. We mitigate default risk by investing in high grade investment securities. By policy, we limit the amount of credit exposure to an issuer, except U.S. Treasuries and U.S. agencies.

Our exposure to interest rate risk arising from our Term Loan (see Note 5, *Debt*, of Notes to Consolidated Financial Statements) is insignificant as a result of the interest-rate swap agreement (see Note 7, *Derivative Financial Instruments*, of Notes to Consolidated Financial Statements) that we entered into with Union Bank to hedge the interest payments on our Building Term Loan.

We use interest rate derivative instruments to manage certain interest rate exposures. We do not use derivative instruments for trading or speculative purposes. The fair market value of our fixed rate securities may be adversely impacted by increases in interest rates while income earned on floating rate securities may decline as a result of decreases in interest rates. A hypothetical 100 basis-point (one percentage point) increase or decrease in interest rates compared to rates at December 26, 2020 and December 28, 2019 would have affected the fair value of our investment portfolio by $0.1 million and $1.3 million, respectively.

Item 8: *Financial Statements and Supplementary Data*

Consolidated Financial Statements

The consolidated financial statements and supplementary data required by this item are included in the section entitled "Consolidated Financial Statements" of this Annual Report on Form 10-K. See Item 15 for a list of our consolidated financial statements.

Item 9: *Changes in and Disagreements with Accountants on Accounting and Financial Disclosure*

None.

Item 9A: *Controls and Procedures*

Evaluation of Disclosure Controls and Procedures

Based on our management’s evaluation (with the participation of our principal executive officer and principal financial officer), as of the end of the period covered by this report, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, (the “Exchange Act”)) were effective to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) except ad described below that occurred during the fiscal year ended December 26, 2020, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

On July 30, 2020, we completed the acquisition of the probe card assets of Advantest Corporation ("Baldwin Park"), located in Baldwin Park, California, and on October 19, 2020, we acquired 100% of the shares of High Precision Devices, Inc. ("HPD"), located in Boulder, Colorado, and are integrating the acquired businesses into our overall internal control over financial reporting process. Our management is in the process of assessing the internal control over financial reporting and is implementing or revising internal controls where necessary.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Internal control over financial reporting is a process designed by, or under the supervision of, our Principal Executive Officer and Principal Financial Officer, and effected by our board of directors, management and other personnel and consultants, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, and includes those policies and procedures that:

(i) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect our transactions and dispositions of assets;

(ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with the authorization of our management and directors; and

(iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

We acquired Baldwin Park and HPD on July 30, 2020 and October 19, 2020, respectively, and have not yet completed the process of integrating the acquired business' internal control over financial reporting into our overall internal control over financial reporting process. Accordingly, excluded from our assessment of internal control over financial reporting as of December 26, 2020 are the internal controls of Baldwin Park and HPD. Baldwin Park's total assets, including goodwill and identified intangibles, and total revenues represented approximately 4% and less than 1%, respectively, of the Consolidated Financial Statement amounts as of and for the year ended December 26, 2020. HPD's total assets, including goodwill and identified intangibles, and total revenues represented approximately 3% and less than 1%, respectively, of the Consolidated Financial Statement amounts as of and for the year ended December 26, 2020.

Under the supervision and with the participation of our management, including our Principal Executive Officer and Principal Financial Officer, we conducted an assessment of the effectiveness of our internal control over financial reporting as of December 26, 2020. In making this assessment, our management used the criteria set forth in *Internal Control-Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on the results of this assessment, management has concluded that our internal control over financial reporting was effective as of December 26, 2020.

The effectiveness of our internal control over financial reporting as of December 26, 2020 has been audited by KPMG LLP, an independent registered public accounting firm, as stated in their report which appears in this Annual Report on Form 10-K.

Limitations on the Effectiveness of Controls

Control systems, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control systems' objectives are being met. Further, the design of any control systems must reflect the fact that there are resource constraints, and the benefits of all controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within our company have been detected. These inherent limitations include the realities that judgments in decision making can be faulty and that breakdowns can occur because of simple error or mistake. Control systems can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is based, in part, on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

CEO and CFO Certifications

We have attached as exhibits to this Annual Report on Form 10-K the certifications of our Chief Executive Officer and Chief Financial Officer, which are required in accordance with the Exchange Act. We recommend that this Item 9A be read in conjunction with the certifications for a more complete understanding of the subject matter presented.

Item 9B: ***Other Information***

None.

PART III

Item 10: ***Directors, Executive Officers and Corporate Governance***

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders.

Item 11: ***Executive Compensation***

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders under the caption Executive Compensation and Related Information.

Item 12: ***Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders under the caption Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Item 13: ***Certain Relationships and Related Transactions, and Director Independence***

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders under the caption Certain Relationships and Related Transactions.

Item 14: ***Principal Accountant Fees and Services***

The information required by this item is incorporated by reference to the proxy statement for our 2021 Annual Meeting of Stockholders under the caption Principal Auditor Fees and Services.

PART IV

Item 15: ***Exhibits, Financial Statement Schedules***

Financial Statements and Schedules

The Consolidated Financial Statements, together with the report thereon of KPMG LLP, are included on the pages indicated below:

Financial statement schedules have been omitted because they are not applicable or the required information is shown in the consolidated financial statements or notes thereto.

Exhibits

The exhibits listed in the accompanying index to exhibits are filed or incorporated by reference as part of this Annual Report on Form 10-K.

Item 16: ***Form 10-K Summary***

None.

EXHIBIT INDEX

		Incorporated by Reference				
Exhibit Number	Exhibit Description	Form	File No	Date of First Filing	Exhibit Number	Filed Herewith
3.1	Amended and Restated Certificate of Incorporation of the Registrant as filed with the Delaware Secretary of State on June 17, 2003	S-1	333-109815	10/20/2003	3.01	
3.2	Amended and Restated Bylaws of the Registrant	8-K	000-50307	7/22/2016	3.2	
4.1	Specimen Common Stock Certificate	S-1/A	333-86738	5/28/2002	4.01	
4.2	Description of Securities	—	—	—	—	X
10.3+	Form of Indemnity Agreement	S-1/A	333-86738	5/28/2002	10.01	
10.4+	Form of Change of Control Severance Agreement	10-K	000-50307	3/14/2005	10.48	
10.9+	Employee Incentive Plan, as amended and restated effective October 1, 2019	10-K	000-50307	2/21/2020	10.9	
10.10+	Equity Incentive Plan, as amended and restated effective May 15, 2020	DEF 14A	000-50307	4/3/2020	Appendix A	
10.11+	Employee Stock Purchase Plan, as amended and restated May 18, 2018	DEF 14A	000-50307	4/3/2018	Appendix A	
10.12	Pacific Corporate Center Lease (Building 1) by and between Greenville Holding Company LLC (successor to Greenville Investors, L.P.) ("Greenville") and the Registrant dated May 3, 2001	S-1/A	333-86738	6/10/2003	10.18	
10.13	First Amendment to Pacific Corporate Center Lease (Building 1) by and between Greenville and the Registrant dated January 31, 2003	S-1/A	333-86738	5/7/2003	10.18.1	
10.14	Pacific Corporate Center Lease (Building 2) by and between Greenville and the Registrant dated May 3, 2001	S-1/A	333-86738	6/10/2003	10.19	
10.15	First Amendment to Pacific Corporate Center Lease (Building 2) by and between Greenville and the Registrant dated January 31, 2003	S-1/A	333-86738	5/7/2003	10.19.1	
10.16	Pacific Corporate Center Lease (Building 3) by and between Greenville and the Registrant dated May 3, 2001	S-1/A	333-86738	6/10/2003	10.20	
10.17+	First Amendment to Pacific Corporate Center Lease (Building 3) by and between Greenville and the Registrant dated January 31, 2003	S-1/A	333-86738	5/7/2003	10.20.1	
10.18	Third Amendment, dated December 19, 2016, between FormFactor, Inc. and MOHR PCC, LP, to Pacific Corporate Center Leases (Buildings 1, 2 and 3), dated May 3, 2001, by and between Greenville Investors, L.P. and FormFactor, Inc., as amended	8-K	000-50307	12/23/2016	10.2	
10.19+	Pacific Corporate Center Lease by and between Greenville and the Registrant dated September 7, 2004, as amended by First Amendment to Building 6 Lease dated August 16, 2006	10-Q	000-50307	11/7/2006	10.01	
10.20	Second Amendment, dated December 19, 2016, between FormFactor, Inc. and MOHR PCC, LP, to Pacific Corporate Center Lease, dated October 5, 2004, by and between Greenville Investors, L.P. and FormFactor, Inc., as amended	8-K	000-50307	12/23/2016	10.1	
10.21	Third Amendment, dated October 1, 2018, between FormFactor, Inc. and MOHR PCC, LP, to Pacific Corporate Center Lease, dated October 5, 2004, by and between Greenville Investors, L.P. and FormFactor, Inc., as amended	8-K	000-50307	10/2/2018	10.1	
10.22	Fourth Amendment, dated October 1, 2018, between FormFactor, Inc. and MOHR PCC, LP, to Pacific Corporate Center Lease, dated October 5, 2004, by and between Greenville Investors, L.P. and FormFactor, Inc., as amended	8-K	000-50307	10/2/2018	10.2	
10.27	Rental Agreement by and between Cascade Microtech Dresden GmbH and Süss Grundstücksverwaltungs GbR dated as of June 17, 2011.	10-Q	000-51072	8/10/2011	10.3	
10.29	First Amendment to Lease dated January 10, 2007, between Nimbus Center LLC (as successor in interest to Spieker Properties, L.P.) and Cascade Microtech, Inc.	10-Q	000-51072	5/9/2014	10.1	
10.30	Second Amendment to Lease dated February 25, 2013, between Nimbus Center LLC and Cascade Microtech, Inc.	10-Q	000-51072	5/8/2013	10.2	

10.31	Third Amendment to Lease dated January 23, 2014, between Nimbus Center LLC and Cascade Microtech, Inc.	10-Q	000-51072	5/9/2014	10.2	
10.32	Fourth Amendment to Lease dated March 31, 2014, between Nimbus Center LLC and Cascade Microtech, Inc.	10-Q	000-51072	5/9/2014	10.3	
10.33	Fifth Amendment to Lease dated September 24, 2014, between Nimbus Center LLC and Cascade Microtech, Inc.	10-K	000-51072	3/72016	10.22	
10.34	Sixth Amendment to Lease dated July 8, 2015, between Nimbus Center LLC and Cascade Microtech, Inc.	10-K	000-51072	3/72016	10.23	
10.35+	Employment Offer Letter, dated August 29, 2012 to Mike Slessor	10-K	000-50307	3/13/2013	10.19+	
10.37+	CEO Change of Control and Severance Agreement, dated April 28, 2016 by and between Mike Slessor and the Registrant	10-K	000-50307	3/15/2017	10.35	
10.39+	Employment Offer Letter, dated February 15, 2018 to Shai Shahar	10-Q	000-50307	5/8/2018	10.1	
21.1	List of Registrant's subsidiaries	—	—	—	—	X
23.1	Consent of Independent Registered Public Accounting Firm - KPMG LLP	—	—	—	—	X
24.1	Power of Attorney (included on the signature page of this Form 10-K)	—	—	—	—	X
31.1	Certification of Chief Executive Officer pursuant to 15 U.S.C. Section 7241, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	—	—	—	—	X
31.2	Certification of Chief Financial Officer pursuant to 15 U.S.C. Section 7241, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	—	—	—	—	X
32.1*	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	—	—	—	—	X
101**	The following financial statements from the Company's Annual Report on Form 10-K for the year ended December 26, 2020, formatted in Inline XBRL: (i) Consolidated Balance Sheets, (ii) Consolidated Statements of Income, (iii) Consolidated Statements of Comprehensive Income, (iv) Consolidated Statements of Cash Flows, and (v) Notes to Consolidated Financial Statements, tagged as blocks of text and including detailed tags.	—	—	—	—	X
101.SCH**	XBRL Taxonomy Extension Schema Document	—	—	—	—	X
101.CAL**	XBRL Taxonomy Extension Calculation Linkbase Document	—	—	—	—	X
101.DEF**	XBRL Taxonomy Extension Definition Linkbase Document	—	—	—	—	X
101.LAB**	XBRL Taxonomy Extension Label Linkbase Document	—	—	—	—	X
101.PRE**	XBRL Taxonomy Extension Presentation Linkbase Document	—	—	—	—	X
104	The cover page from the Company's Annual Report on Form 10-K for the year ended December 26, 2020, formatted in Inline XBRL (included as Exhibit 101).	—	—	—	—	X

* This exhibit shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934 or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date hereof and irrespective of any general incorporation language in any filings.

** Pursuant to Rule 406T of Regulation S-T, these interactive data files are deemed not filed or part of a registration statement or prospectus for purposes of Sections 11 or 12 of the Securities Act of 1933 or Section 18 of the Securities Exchange Act of 1934 and otherwise are not subject to liability.

*** The schedules, exhibits, and annexes to this exhibit have been omitted in reliance on Item 601(b)(2) of Regulation S-K and will be furnished supplementally to the SEC upon request.

\+ Indicates a management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

		FORMFACTOR, INC.	
Date:	February 22, 2021	By:	/s/ SHAI SHAHAR
			Shai Shahar *Chief Financial Officer* *(Principal Financial Officer and Principal Accounting Officer)*

POWER OF ATTORNEY

KNOW BY ALL PERSONS BY THESE PRESENTS, that each of the undersigned whose signature appears below constitutes and appoints Shai Shahar and Jason Cohen, and each of them, the undersigned's true and lawful attorneys in-fact and agents with full power of substitution, for the undersigned and in the undersigned's name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K and any other documents in connection therewith, and to file the same, with all exhibits thereto, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act requisite and necessary to be done with respect to this Annual Report on Form 10-K, including amendments, as fully to all intents and purposes as the undersigned might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or his or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN WITNESS WHEREOF, each of the undersigned has executed this Power of Attorney as of the date indicated below.
Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signature	Title	Date
Principal Executive Officer: /s/ MICHAEL D. SLESSOR Michael D. Slessor	Chief Executive Officer and Director	February 22, 2021
Principal Financial Officer and Principal Accounting Officer: /s/ SHAI SHAHAR Shai Shahar	Chief Financial Officer	February 22, 2021

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signature	Title	Date
Additional Directors:		
/s/ LOTHAR MAIER Lothar Maier	Director	February 22, 2021
/s/ EDWARD ROGAS, JR Edward Rogas, Jr	Director	February 22, 2021
/s/ KELLEY STEVEN-WAISS Kelley Steven-Waiss	Director	February 22, 2021
/s/ SHERI RHODES Sheri Rhodes	Director	February 22, 2021
/s/ RAYMOND LINK Raymond Link	Director	February 22, 2021
/s/ REBECA OBREGON-JIMENEZ Rebeca Obregon-Jimenez	Director	February 22, 2021
/s/ THOMAS ST. DENNIS Thomas St. Dennis	Director	February 22, 2021

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
FormFactor, Inc.:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

We have audited the accompanying consolidated balance sheets of FormFactor, Inc. and subsidiaries (the Company) as of December 26, 2020 and December 28, 2019, the related consolidated statements of income, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 26, 2020, and the related notes (collectively, the consolidated financial statements). We also have audited the Company's internal control over financial reporting as of December 26, 2020, based on the criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 26, 2020 and December 28, 2019, and the results of its operations and its cash flows for each of the years in the three-year period ended December 26, 2020, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 26, 2020, based on the criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

The Company acquired the probe card assets of Advantest Corporation (Baldwin Park) and 100% of the shares of High Precision Devices, Inc. ("HPD") during 2020, and management excluded from its assessment of the effectiveness of the Company's internal control over financial reporting as of December 26, 2020, Baldwin Park's and HPD's internal control over financial reporting associated with total assets representing approximately 4% and 3% of consolidated assets as of December 26, 2020, respectively, and total revenues each representing less than 1% of consolidated revenues as of and for the year ended December 26, 2020. Our audit of internal control over financial reporting of the Company also excluded an evaluation of the internal control over financial reporting of Baldwin Park and HPD.

Change in Accounting Principle

As discussed in note 6 to the consolidated financial statements, the Company has changed its method of accounting for leases as of December 30, 2018 due to the adoption of Accounting Standards Update ("ASU") 2016-02, "Leases (Topic 842)," ASU 2018-10, "*Codification Improvements to Topic 842, Leases*," ASU 2018-11, "*Leases (Topic 842): Targeted Improvements*," and ASU 2019-01, "*Leases (Topic 842): Codification Improvements*."

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express an opinion on the Company's consolidated financial statements and an opinion on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgment. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Evaluation of inventory excess and obsolescence

As discussed in notes 2 and 3 to the consolidated financial statements, the Company's net inventories were $99.2 million as of December 26, 2020, and inventory write-downs totaled $13.1 million for the year ended December 26, 2020. The Company states its inventories at the lower of cost or net realizable value. The Company records an adjustment to the cost basis of inventory when evidence exists that the net realizable value of inventory is lower than its cost, which occurs when the Company has excess and/or obsolete inventory. The Company's model to estimate the excess and/or obsolete inventory is based on an analysis of existing inventory quantities compared to estimated future consumption. Future consumption is estimated based upon assumptions about how past consumption, recent purchases, backlog or other factors indicate future consumption.

We identified the evaluation of inventory excess and obsolescence as a critical audit matter. Complex auditor judgment was required to evaluate that past consumption, recent purchases, or backlog accurately indicate future consumption and thus meet the accounting objective of recording inventory at the lower of its cost or net realizable value.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls related to the critical audit matter. This included controls related to the Company's process to develop the assumptions used to predict future consumption of inventory. We assessed the Company's assumptions about how past consumption, recent purchases, or backlog indicate future consumption by: (1) Evaluating historical cumulative write down trends and relevant changes to the overall business environment, including key customers and product lines in order to evaluate the Company's methodology that actual past consumption history, recent purchases, or backlog are relevant as predictors of future inventory consumption, and (2) Selecting a sample of products within inventory and for each sample selection (a) evaluating how past consumption, recent purchases, or backlog indicate future consumption of the specific sampled inventory product, and (b) recalculating the Company's estimate of the cumulative inventory write-downs based on the actual quantity of product on hand compared to the estimate of future consumption.

/s/ KPMG LLP

We have served as the Company's auditor since 2013.

Portland, Oregon
February 22, 2021

FORMFACTOR, INC.

CONSOLIDATED BALANCE SHEETS

	December 26, 2020	December 28, 2019
	(In thousands, except share and per share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 187,225	$ 144,545
Marketable securities	67,810	76,327
Accounts receivable, net	107,603	97,868
Inventories, net	99,229	83,258
Restricted cash	1,904	1,981
Prepaid expenses and other current assets	23,303	15,064
Total current assets	487,074	419,043
Restricted cash	1,969	1,411
Operating lease, right-of-use-assets	30,756	31,420
Property, plant and equipment, net	104,103	58,747
Goodwill	212,761	199,196
Intangibles, net	59,147	57,610
Deferred tax assets	66,242	71,252
Other assets	1,165	1,203
Total assets	$ 963,217	$ 839,882
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 62,045	$ 40,914
Accrued liabilities	55,342	36,439
Current portion of term loans, net of unamortized issuance cost of $5 and $29	9,516	42,846
Deferred revenue	20,964	9,810
Operating lease liabilities	6,704	6,551
Total current liabilities	154,571	136,560
Term loans, less current portion, net of unamortized issuance cost of $70 and $0	24,978	15,639
Deferred tax liabilities	5,346	6,986
Long-term operating lease liabilities	27,996	29,088
Other liabilities	6,242	10,612
Total liabilities	219,133	198,885
Stockholders' equity:		
Preferred stock, $0.001 par value:		
10,000,000 shares authorized; no shares issued and outstanding	—	—
Common stock, $0.001 par value:		
250,000,000 shares authorized; 77,437,997 and 75,764,990 shares issued and outstanding	78	76
Additional paid-in capital	903,838	885,821
Accumulated other comprehensive income (loss)	5,886	(659)
Accumulated deficit	(165,718)	(244,241)
Total stockholders' equity	744,084	640,997
Total liabilities and stockholders' equity	$ 963,217	$ 839,882

The accompanying notes are an integral part of these consolidated financial statements.

FORMFACTOR, INC.

CONSOLIDATED STATEMENTS OF INCOME

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
	(In thousands, except per share data)		
Revenues	$ 693,616	$ 589,464	$ 529,675
Cost of revenues	405,696	351,968	319,336
Gross profit	287,920	237,496	210,339
Operating expenses:			
Research and development	89,034	81,499	74,976
Selling, general and administrative	115,098	106,335	99,254
Total operating expenses	204,132	187,834	174,230
Operating income	83,788	49,662	36,109
Interest income	1,501	2,714	1,356
Interest expense	(864)	(1,915)	(3,314)
Other income (expense), net	750	602	(224)
Income before income taxes	85,175	51,063	33,927
Provision (benefit) for income taxes	6,652	11,717	(70,109)
Net income	$ 78,523	$ 39,346	$ 104,036
Net income per share:			
Basic	$ 1.02	$ 0.52	$ 1.42
Diluted	$ 0.99	$ 0.51	$ 1.38
Weighted-average number of shares used in per share calculations:			
Basic	76,681	74,994	73,482
Diluted	79,001	77,286	75,182

The accompanying notes are an integral part of these consolidated financial statements.

FORMFACTOR, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
	(In thousands)		
Net income	$ 78,523	$ 39,346	$ 104,036
Other comprehensive income (loss), net of tax:			
Translation adjustments and other	5,131	(1,028)	(1,902)
Unrealized gains (losses) on available-for-sale marketable securities	226	316	(8)
Unrealized gains (losses) on derivative instruments	1,188	(727)	(331)
Other comprehensive income (loss), net of tax	6,545	(1,439)	(2,241)
Comprehensive income	$ 85,068	$ 37,907	$ 101,795

The accompanying notes are an integral part of these consolidated financial statements.

FORMFACTOR, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total
	Shares	Amount				
			(In thousands, except shares)			
Balances, December 30, 2017	72,532,176	$ 73	$ 843,116	$ 3,021	$ (387,573)	$ 458,637
Issuance of common stock under the Employee Stock Purchase Plan	610,297	1	6,661	—	—	6,662
Issuance of common stock pursuant to exercise of options for cash	134,609	—	1,158	—	—	1,158
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	862,630	—	(5,791)	—	—	(5,791)
Stock-based compensation	—	—	17,753	—	—	17,753
ASU 2017-12 Adoption	—	—	—	—	(50)	(50)
Other comprehensive loss	—	—	—	(2,241)	—	(2,241)
Net income	—	—	—	—	104,036	104,036
Balances, December 29, 2018	74,139,712	74	862,897	780	(283,587)	580,164
Issuance of common stock under the Employee Stock Purchase Plan	544,271	1	6,806	—	—	6,807
Issuance of common stock pursuant to exercise of options for cash	162,956	—	1,176	—	—	1,176
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	918,051	1	(8,026)	—	—	(8,025)
Stock-based compensation	—	—	22,968	—	—	22,968
Other comprehensive loss	—	—	—	(1,439)	—	(1,439)
Net income	—	—	—	—	39,346	39,346
Balances, December 28, 2019	75,764,990	76	885,821	(659)	(244,241)	640,997
Issuance of common stock under the Employee Stock Purchase Plan	485,566		7,875	—	—	7,875
Issuance of common stock pursuant to exercise of options for cash	255,769	1	2,134	—	—	2,135
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	931,672	1	(15,451)	—	—	(15,450)
Stock-based compensation	—	—	23,459	—	—	23,459
Other comprehensive income	—	—	—	6,545	—	6,545
Net income	—	—	—	—	78,523	78,523
Balances, December 26, 2020	77,437,997	$ 78	$ 903,838	$ 5,886	$ (165,718)	$ 744,084

The accompanying notes are an integral part of these consolidated financial statements.

FORMFACTOR, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
	(In thousands)		
Cash flows from operating activities:			
Net income	$ 78,523	$ 39,346	$ 104,036
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	20,694	17,185	14,314
Amortization	27,991	27,672	29,373
Accretion of discount on investments	(2)	(365)	(10)
Reduction in the carrying amount of right-of-use assets	5,955	5,269	—
Stock-based compensation expense	23,830	23,176	17,827
Amortization of debt issuance costs	32	160	390
Deferred income tax provision (benefit)	(562)	4,954	(74,908)
Provision for excess and obsolete inventories	13,117	10,421	10,479
Acquired inventory step-up amortization	838	465	—
Loss on disposal of long-lived assets	451	486	325
Gain on contingent consideration	(2,879)	—	—
Foreign currency transaction losses (gains)	(968)	408	125
Loss on derivative instruments	372	110	—
Changes in assets and liabilities:			
Accounts receivable	(3,545)	481	(13,830)
Inventories	(22,191)	(14,295)	(21,298)
Prepaid expenses and other current assets	(6,207)	230	1,204
Other assets	179	(441)	707
Accounts payable	16,788	(27)	3,050
Accrued liabilities	13,892	7,517	(6,219)
Other liabilities	362	166	3,109
Deferred revenues	8,901	3,130	26
Operating lease liabilities	(6,315)	(5,000)	—
Net cash provided by operating activities	169,256	121,048	68,700
Cash flows from investing activities:			
Acquisition of property, plant and equipment	(55,865)	(20,847)	(19,869)
Acquisition of business, net of cash acquired	(51,880)	(20,524)	—
Proceeds from sale of subsidiary	82	132	94
Proceeds from sale of property and property, plant and equipment	—	—	23
Purchases of marketable securities	(51,224)	(76,327)	(30,566)
Proceeds from maturities of marketable securities	59,965	51,214	29,023
Net cash used in investing activities	(98,922)	(66,352)	(21,295)
Cash flows from financing activities:			
Proceeds from issuances of common stock	10,010	8,093	7,712
Tax withholdings related to net share settlements of equity awards	(15,450)	(8,025)	(5,791)
Proceeds from term loan	18,000	23,354	—
Payments on term loan	(43,417)	(30,000)	(41,250)
Payment of term loan issuance costs	(78)	—	—
Net cash used in financing activities	(30,935)	(6,578)	(39,329)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	3,762	(727)	(256)
Net increase in cash, cash equivalents and restricted cash	43,161	47,391	7,820
Cash, cash equivalents and restricted cash, beginning of year	147,937	100,546	92,726
Cash, cash equivalents and restricted cash, end of year	$ 191,098	$ 147,937	$ 100,546

The accompanying notes are an integral part of these consolidated financial statements.

FORMFACTOR, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
	(In thousands)		
Supplemental disclosure of non-cash investing and financing activities:			
Operating lease, right-of-use assets obtained in exchange for lease obligations	$ 1,912	$ 36,709	$ —
Contingent consideration payable related to FRT acquisition	—	5,364	—
Change in accounts payable and accrued liabilities related to property, plant and equipment purchases	2,545	866	2,290
Supplemental disclosure of cash flow information:			
Income taxes paid, net	$ 9,150	$ 4,324	$ 4,576
Cash paid for interest	867	1,405	3,113
Reconciliation of cash, cash equivalents and restricted cash:			
Cash and cash equivalents	$ 187,225	$ 144,545	$ 98,472
Restricted cash, current	1,904	1,981	849
Restricted cash	1,969	1,411	1,225
Total cash, cash equivalents and restricted cash	$ 191,098	$ 147,937	$ 100,546

The accompanying notes are an integral part of these consolidated financial statements.

Note 1—Formation and Nature of Business

FormFactor, Inc. was incorporated in Delaware on April 15, 1993 and is headquartered in Livermore, California. We are a leading provider of test and measurement technologies. We provide a broad range of high-performance probe cards, analytical probes, probe stations, metrology systems, thermal systems, and cryogenic systems to both semiconductor companies and scientific institutions. Our products provide electrical and physical information from a variety of semiconductor and electro-optical devices and integrated circuits from early research, through development, to high-volume production. Customers use our products and services to lower production costs, improve yields, and enable development of complex next generation products. We believe our technology leadership enables critical roadmap advances for our customers.

Design, development and manufacturing operations are located in Livermore, San Jose, Carlsbad, and Baldwin Park, California, Beaverton, Oregon and Boulder, Colorado, United States and Bergisch Gladbach, Munich and Thiendorf, Germany, and sales, service and support operations are located in the United States, Germany, France, South Korea, Japan, Taiwan, China and Singapore.

Fiscal Year
Our fiscal year ends on the last Saturday in December. The fiscal years ended on December 26, 2020, December 28, 2019 and December 29, 2018, each consisted of 52 weeks, respectively.

Note 2—Summary of Significant Accounting Policies

Basis of Consolidation and Foreign Currency Translation
The consolidated financial statements include our accounts and those of our wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated.

We completed the acquisitions of FRT GmbH ("FRT") on October 9, 2019, the probe card assets of Advantest Corporation ("Baldwin Park") on July 30, 2020, and High Precision Devises, Inc. ("HPD") on October 19, 2020. Accordingly, our Consolidated Statements of Income include the results of operations of FRT, Baldwin Park, and HPD since those dates. See Note 4, *Acquisitions*.

The functional currencies of certain of our foreign subsidiaries are the local currencies and, accordingly, all assets and liabilities of these foreign operations are translated to U.S. Dollars at current period-end exchange rates, and revenues and expenses are translated to U.S. Dollars using average exchange rates in effect during the period. The gains and losses from the foreign currency translation of these subsidiaries' financial statements are included as a separate component of stockholders' equity on our Consolidated Balance Sheets under Accumulated other comprehensive income (loss).

Certain other of our foreign subsidiaries use the U.S. Dollar as their functional currency. Accordingly, monetary assets and liabilities in non-functional currencies of these subsidiaries are remeasured using exchange rates in effect at the end of the period. Revenues and costs in local currency are remeasured using average exchange rates for the period, except for costs related to those balance sheet items that are remeasured using historical exchange rates. The resulting remeasurement gains and losses are included in the Consolidated Statements of Income as a component of Other income (expense), net as incurred.

Use of Estimates
The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Estimates may change as new information is obtained. We believe that the estimates, assumptions and judgments involved in revenue recognition, fair value of marketable securities, fair value of derivative financial instruments used to hedge both foreign currency and interest rate exposures, allowance for doubtful accounts, reserves for product warranty, valuation of obsolete and slow moving inventory, assets acquired and liabilities assumed in business combinations, legal contingencies, valuation of goodwill, the assessment of recoverability of long-lived assets, valuation and recognition of stock-based compensation, provision for income taxes and valuation of deferred tax assets have the greatest potential impact on our consolidated financial statements. Actual results could differ from those estimates.

Business Acquisitions

Our consolidated financial statements include the operations of acquired businesses after the completion of their respective acquisitions. We account for acquired businesses using the acquisition method of accounting, which requires, among other things, that assets acquired and liabilities assumed be recognized at their estimated fair values as of the acquisition date, and that the fair value of acquired intangibles be recorded on the balance sheet. Transaction costs are expensed as incurred. Any excess of the purchase price over the assigned fair values of the net assets acquired is recorded as goodwill.

Cash and Cash Equivalents and Marketable Securities

Cash and cash equivalents consist of deposits and financial instruments which are readily convertible into cash and have original maturities of 90 days or less at the time of acquisition. Marketable securities consist primarily of highly liquid investments with maturities of greater than 90 days when purchased. We classify our marketable securities as available-for-sale and, accordingly, report them at fair value with the related unrealized gains and losses included in Accumulated other comprehensive income (loss) in our Consolidated Balance Sheets. Any unrealized losses which are considered to be other-than-temporary are recorded in Other income (expense), net, in the Consolidated Statements of Income. Realized gains and losses on the sale of marketable securities are determined using the specific-identification method and recorded in Other income (expense), net, in the Consolidated Statements of Income.

All of our available-for-sale investments are subject to a periodic impairment review. If an available-for-sale debt security’s fair value is less than its amortized cost basis, then we evaluate whether the decline is the result of a credit loss, in which case an impairment is recorded through an allowance for credit losses. Unrealized gains and losses not attributable to credit losses are included, net of tax, in Accumulated other comprehensive income (loss) in our Consolidated Balance Sheets. We did not record an allowance for credit losses during fiscal 2020.

Foreign Exchange Management

We transact business in various foreign currencies. We enter into forward foreign exchange contracts in an effort to mitigate the risks associated with currency fluctuations on certain foreign currency balance sheet exposures and certain operational costs denominated in local currency impacting our statement of income. For accounting purposes, certain of our foreign currency forward contracts are not designated as hedging instruments and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Consolidated Balance Sheets with changes in fair value recorded within Other income (expense), net in our Consolidated Statements of Income for both realized and unrealized gains and losses. Certain of our foreign currency forward contracts are designated as cash flow hedges, and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Consolidated Balance Sheets with changes in fair value recorded as a component of accumulated other comprehensive income (loss) and reclassified into earnings in the same period in which the hedged transaction affects earnings, and in the same line item on the Consolidated Statements of Income as the impact of the hedge transaction. We do not use derivative financial instruments for trading or speculative purposes.

Accounts Receivable and Allowance for Doubtful Accounts

The majority of our accounts receivable are derived from sales to large multinational semiconductor manufacturers throughout the world, are recorded at their invoiced amount and do not bear interest.

In order to monitor potential credit losses, we perform ongoing credit evaluations of our customers' financial condition. An allowance for doubtful accounts is maintained based upon our assessment of the expected collectability of all accounts receivable. The allowance for doubtful accounts is reviewed and assessed for adequacy on a quarterly basis. We take into consideration (1) any circumstances of which we are aware of a customer's inability to meet its financial obligations and (2) our judgments as to prevailing economic conditions in the industry and their impact on our customers. If circumstances change, and the financial condition of our customers is adversely affected and they are unable to meet their financial obligations, we may need to take additional allowances, which would result in an increase in our operating expense.

Activity related to our allowance for doubtful accounts receivable was as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Balance at beginning of year	$ 222	$ 185	$ 200
Charges (reversals) to costs and expenses	26	37	(15)
Balance at end of year	$ 248	$ 222	$ 185

Inventories

We state our inventories at the lower of cost (principally standard cost which approximates actual cost on a first in, first out basis) or net realizable value. We continually assess the value of our inventory and will periodically write down its value for estimated excess inventory and product obsolescence based upon an analysis of existing inventory quantities compared to estimated future consumption. Future consumption is estimated based upon assumptions about how past consumption, recent purchases, backlog and other factors indicate future consumption. On a quarterly basis, we review existing inventory quantities in comparison to our past consumption, recent purchases, backlog and other factors to determine what inventory quantities, if any, may not be sellable. Based on this analysis, we record an adjustment to the cost basis of inventory when evidence exists that the net realizable value of inventory is lower than its cost, which occurs when we have excess and/or obsolete inventory. Once the value is adjusted, the original cost of our inventory, less the related inventory write-down, represents the new cost basis. Reversal of these write downs is recognized only when the related inventory has been scrapped or sold. Shipping and handling costs are classified as a component of Cost of revenues in the Consolidated Statements of Income.

We design, manufacture and sell a custom product into a market that has been subject to cyclicality and significant demand fluctuations. Many of our products are complex, custom to a specific chip design and have to be delivered on short lead-times. Probe cards are manufactured in low volumes, but, for certain materials, the purchases are often subject to minimum order quantities in excess of the actual underlying probe card demand. It is not uncommon for us to acquire production materials and commence production activities based on estimated production yields and forecasted demand prior to, or in excess of, actual demand for our probe cards. These factors result in normal recurring inventory valuation charges to Cost of revenues.

Inventory write downs totaled $13.1 million, $10.4 million and $10.5 million for fiscal 2020, 2019 and 2018, respectively.

Restricted Cash

Restricted cash is comprised primarily of funds held by our foreign subsidiaries for employee obligations, office leases, customer deposits, temporary customs import permits, and environmental remediation.

Property, Plant, and Equipment

Property, plant and equipment is stated at cost less accumulated depreciation and amortization. Depreciation is provided on a straight-line method. Machinery and equipment, computer equipment and software, and furniture and fixtures are depreciated over 1 to 5 years.

Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the related asset. Construction-in-progress assets are not depreciated until the assets are placed in service. Upon sale or retirement of assets, the cost and related accumulated depreciation or amortization are removed from the Consolidated Balance Sheets and the resulting gain or loss is reflected in Operating income in our Consolidated Statements of Income.

Leases

The Company determines if an arrangement is a lease at its inception. Right-of-use (“ROU”) assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. We uses our estimated incremental borrowing rate in determining the present value of lease payments considering the term of the lease, which is derived from information available at the lease commencement date. The lease term includes renewal options when it is reasonably certain that the option will be exercised and excludes termination options. To the extent that the Company’s agreements have variable lease payments, the Company includes variable lease payments that depend on an index or a rate and excludes those that depend on facts or circumstances occurring after the commencement date, other than the passage of time.

Lease expense for these leases is recognized on a straight-line basis over the lease term. We have elected not to recognize ROU assets and lease liabilities that arise from short-term leases for any class of underlying asset. Operating leases are included in Operating lease, right-of-use-assets, Operating lease liabilities, and Long-term operating lease liabilities in our Consolidated Balance Sheets.

Goodwill

Goodwill represents the excess of the purchase price over the fair value of identifiable assets acquired and liabilities assumed. Goodwill is not amortized, rather assessed, at least annually, for impairment at a reporting unit level. Impairment of goodwill exists when the carrying amount of a reporting unit exceeds its fair value. A goodwill impairment loss is recognized for the amount that the carrying amount of the reporting unit, including goodwill, exceeds its fair value, limited to the total amount of goodwill allocated to that reporting unit. If the fair value of a reporting unit exceeds the carrying amount, goodwill of the reporting unit is not considered impaired.

We evaluate impairment by first assessing qualitative factors to determine whether it is necessary to perform a quantitative impairment test. If we determine, as a result of the qualitative assessment, that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, then the quantitative impairment test is required. Otherwise, no further testing is required.

We perform our annual goodwill impairment test in the fourth quarter of each year by assessing qualitative factors, including, but not limited to an assessment of our market capitalization, which was significantly higher than our book value. Based on these tests, we determined that the quantitative impairment test was not required and no impairment charges were recorded in fiscal 2020, 2019 or 2018.

The evaluation of goodwill for impairment requires the exercise of judgment. In the event of future changes in business conditions, we will be required to reassess and update our forecasts and estimates used in future impairment analysis. If the results of these analysis are lower than current estimates, a material impairment charge may result at that time.

See Note 9, *Goodwill and Intangible Assets*, for additional information.

Intangible Assets
Intangible assets consist of acquisition related intangible assets and intellectual property. The intangible assets are being amortized over periods of 1 to 10 years, which reflect the pattern in which economic benefits of the assets are expected to be realized. We perform a review of intangible assets when facts and circumstances indicate that the useful life is shorter than originally estimated or that the carrying amount of assets may not be recoverable. Such facts and circumstances include significant adverse changes in the business climate or legal factors; current period cash flow or operating losses combined with a history of losses or a forecast of continuing losses associated with the use of the intangible assets; and current expectation that the intangible assets will more likely than not be sold or disposed of before the end of their estimated useful lives. We assess the recoverability of identified intangible assets by comparing the projected undiscounted net cash flows associated with the related asset or group of assets over their remaining lives against their respective carrying amounts. Impairments, if any, are based on the excess of the carrying amount over the fair value of those assets.

See Note 9, *Goodwill and Intangible Assets*, for additional information.

Impairment of Long-Lived Assets
We test long-lived assets or asset groups, such as property, plant and equipment and intangible assets, for recoverability when events or changes in circumstances indicate that their carrying amounts may not be recoverable. Circumstances which could trigger a review include, but are not limited to: significant decreases in the market price of the asset; significant adverse changes in the business climate or legal factors; accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of the asset; current period cash flow or operating losses combined with a history of losses or a forecast of continuing losses associated with the use of the asset; and current expectation that the asset will more likely than not be sold or disposed of before the end of its estimated useful life.

Recoverability is assessed based on the carrying amounts of the asset or asset group and the sum of the undiscounted cash flows expected to result from the use and the eventual disposal of the asset. An impairment loss is recognized when the carrying amount is not recoverable and exceeds fair value.

Concentration of Credit Risk and Other Risks and Uncertainties
Financial instruments that potentially subject us to concentrations of credit risk consist primarily of cash equivalents, marketable securities and accounts receivable. Our cash equivalents and marketable securities are held in safekeeping by large, credit worthy financial institutions. We invest our excess cash primarily in U.S. banks, government and agency bonds, money market funds and corporate obligations. We have established guidelines relative to credit ratings, diversification and maturities that seek to maintain safety and liquidity. Deposits in these banks may exceed the amounts of insurance provided on such deposits. To date, we have not experienced any losses on our deposits of cash and cash equivalents. We market and sell our products to a relatively narrow base of customers and generally do not require collateral.

The following customers represented 10% or more of our revenues:

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Intel Corporation	31.5 %	25.3 %	19.0 %
Samsung Electronics., LTD.	*	11.5	*

***** Less than 10% of revenues.

At December 26, 2020, two customers accounted for 15.3% and 13.7% of gross accounts receivable, respectively. At December 28, 2019, three customers accounted for 25.7%, 15.1%, and 11.5% of gross accounts receivable, respectively. No other customers accounted for 10% or more of gross accounts receivable for these fiscal period ends.

We are exposed to non-performance risk by counterparties on our derivative instruments used in hedging activities. We seek to minimize risk by diversifying our hedging program across multiple financial institutions. These counterparties are large international financial institutions, and, to date, no such counterparty has failed to meet its financial obligations to us.

Revenue Recognition

Revenue is recognized upon transferring control of products and services, and the amounts recognized reflect the consideration we expect to be entitled to receive in exchange for these products and services. Revenue is recognized net of any taxes collected from customers, which are subsequently remitted to governmental authorities. An arrangement may include some or all of the following products and services: probe cards, systems, accessories, installation services, service contracts and extended warranty contracts. We sell our products and services direct to customers and to partners in two distribution channels: global direct sales force and through a combination of manufacturers’ representatives and distributors.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer. In contracts with multiple performance obligations, we identify each performance obligation and evaluate whether the performance obligation is distinct within the context of the contract at contract inception. Performance obligations that are not distinct at contract inception are combined and accounted for as one unit of account. Generally, the performance obligations in a contract are considered distinct within the context of the contract and are accounted for as separate units of account.

Our products may be customized to our customers’ specifications, however, control of our product is typically transferred to the customer at the point in time the product is either shipped or delivered, depending on the terms of the arrangement, as the criteria for overtime recognition is not met. In limited circumstances, substantive acceptance by the customer exists which results in the deferral of revenue until acceptance is formally received from the customer. Judgment may be required in determining if the acceptance clause is substantive. In certain instances control of products is transferred to the customer over time based on performance and in those instances we utilize an appropriate input or output measure to determine to what extent control has transferred to the customer. Judgment may be required in determining an appropriate measure of performance.

Installation services are routinely provided to customers purchasing our systems. Installation services are a distinct performance obligation apart from the systems and recognized in the period they are performed. Service contracts, which include repair and maintenance service contracts, and extended warranty contracts are also distinct performance obligations and recognized over the contractual service period, which ranges from one to three years. For these service contracts recognized over time, we use an input measure, days elapsed, to measure progress.

A contract’s transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. In determining the transaction price, we evaluate whether the price is subject to refund or adjustment to determine the net consideration to which we expect to be entitled. We generally do not grant return privileges, except for defective products during the warranty period. Sales incentives and other programs that we may make available to these customers are considered to be a form of variable consideration, which is estimated in determining the contract’s transaction price to be allocated to the performance obligations.

For contracts with multiple performance obligations, we allocate the contract’s transaction price to each performance obligation based on its relative stand-alone selling price. The stand-alone selling prices are determined based on observable prices, which are the prices at which we separately sell these products. For items which do not have observable prices, we use our best estimate of the stand-alone selling prices.

Transaction price allocated to the remaining performance obligations: On December 26, 2020, we had $7.9 million of remaining performance obligations, which were comprised of deferred service contracts and extended warranty contracts and contracts with overtime revenue recognition that are not yet delivered. We expect to recognize approximately 84.1% of our remaining performance obligations as revenue in fiscal 2021, approximately 9.5% in fiscal 2022, and approximately 6.4% in fiscal 2023 and thereafter. The foregoing excludes the value of remaining performance obligations that have original durations of one year or less, and also excludes information about variable consideration allocated entirely to a wholly unsatisfied performance obligation.

Contract balances: The timing of revenue recognition may differ from the timing of invoicing to customers. Accounts receivable is recorded at the invoiced amount, net of an allowance for doubtful accounts. A receivable is recognized in the period we deliver goods or provide services or when our right to consideration is unconditional. A contract asset is recorded when we have performed under the contract but our right to consideration is conditional on something other than the passage of time. Contract assets as of December 26, 2020 and December 28, 2019 were $3.7 million and $0.9 million, respectively, and are reported on the Consolidated Balance Sheets as a component of Prepaid expenses and other current assets.

Contract liabilities include payments received and payments due in advance of performance under a contract and are satisfied as the associated revenue is recognized. Contract liabilities are reported on the Consolidated Balance Sheets on a contract-by-contract basis at the end of each reporting period as a component of Deferred revenue and Other liabilities. Contract liabilities totaled $22.2 million and $10.8 million at December 26, 2020 and December 28, 2019, respectively. During fiscal 2020, we recognized $9.5 million of revenue that was included in contract liabilities as of December 28, 2019.

Costs to obtain a contract: We generally expense sales commissions when incurred as a component of Selling, general and administrative expense as the amortization period is typically less than one year.

Revenue by Category: Refer to Note 15, *Segments and Geographic Information*, for further details.

Warranty Obligations

We offer warranties on certain products and record a liability for the estimated future costs associated with warranty claims at the time revenue is recognized. The warranty liability is based upon historical experience and our estimate of the level of future costs. While we engage in product quality programs and processes, our warranty obligation is affected by product failure rates, material usage and service delivery costs incurred in correcting a product failure. We continuously monitor product returns for warranty and maintain a reserve for the related expenses based upon our historical experience and any specifically identified field failures. As we sell new products to our customers, we must exercise considerable judgment in estimating the expected failure rates. This estimating process is based on historical experience of similar products, as well as various other assumptions that we believe to be reasonable under the circumstances.

We provide for the estimated cost of product warranties at the time revenue is recognized. Warranty costs are reflected in the Consolidated Statement of Income as a Cost of revenues.

A reconciliation of the changes in our warranty liability is as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Balance at beginning of year	$ 1,942	$ 2,102	$ 3,662
Accruals	5,727	3,881	3,181
Settlements	(3,751)	(4,041)	(4,741)
Balance at end of year	$ 3,918	$ 1,942	$ 2,102

Research and Development

Research and development expenses include expenses related to product development, engineering and material costs. All research and development costs are expensed as incurred.

Income Taxes

We utilize the asset and liability method of accounting for income taxes, under which deferred taxes are determined based on the temporary differences between the financial statement and tax basis of assets and liabilities using tax rates expected to be in effect during the years in which the basis differences reverse and for operating losses and tax credit carryforwards. We estimate our provision for income taxes and amounts ultimately payable or recoverable in numerous tax jurisdictions around the world. Estimates involve interpretations of regulations and are inherently complex. Resolution of income tax treatments in individual jurisdictions may not be known for many years after completion of any fiscal year. We are required to evaluate the realizability of our deferred tax assets on an ongoing basis to determine whether there is a need for a valuation allowance with respect to such deferred tax assets. A valuation allowance is recorded when it is more likely than not that some or all of the deferred tax assets will not be realized. In evaluating the ability to recover deferred tax assets, we consider all available positive and negative evidence giving greater weight to our recent cumulative income, our historical ability to utilize net operating losses in recent years and our forecast of future taxable income, including the reversal of temporary differences and the implementation of feasible and prudent tax planning strategies.

We recognize and measure uncertain tax positions taken or expected to be taken in a tax return if it is more likely than not that the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position. The tax benefits recognized are then measured based on the largest benefit that has a greater than 50 percent likelihood of being realized upon ultimate settlement. We report a liability for unrecognized tax benefits resulting from uncertain tax positions taken or expected to be taken in a tax return. We adjust these reserves in light of changing facts and circumstances, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences will impact the provision for income taxes in the period in which such determination is made. The provision for income taxes includes the impact of reserve provisions and changes to reserves that are considered appropriate, as well as the related net interest. We recognize interest and penalties related to unrecognized tax benefits within the income tax provision. Accrued interest and penalties are included within the related tax liability in the Consolidated Balance Sheets.

We file annual income tax returns in multiple taxing jurisdictions around the world. A number of years may elapse before an uncertain tax position is audited and finally resolved. While it is often difficult to predict the final outcome or the timing of resolution of any particular uncertain tax position, we believe that our related liability reflects the most likely outcome. We adjust the liability, as well as the related interest, in light of changing facts and circumstances. Settlement of any particular position could require the use of cash.

Stock-Based Compensation

We recognize compensation expense for all stock-based awards based on the grant-date estimated fair values. The value of the portion of the award that is ultimately expected to vest is recognized as expense ratably over the requisite service periods in our Consolidated Statements of Income. The fair value of stock options is measured using the Black-Scholes option pricing model, while the fair value for restricted stock units ("RSUs") is measured based on the closing market price of our common stock on the date of grant. The fair value of Performance RSUs ("PRSU") is based on certain market performance criteria and is measured using the Monte Carlo simulation pricing model.

See Notes 11, *Stockholders' Equity*, and 12, *Stock-Based Compensation*, for additional information.

Net Income Per Share

Basic net income per share is computed by dividing net income by the weighted-average number of common shares outstanding for the period. Diluted net income per share is computed giving effect to all potentially dilutive common stock and common stock equivalents, including stock options, RSUs and common stock subject to repurchase.

The following table reconciles the shares used in calculating basic net income per share and diluted net income per share (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Weighted-average shares used in computing basic net income per share	76,681	74,994	73,482
Add potentially dilutive securities	2,320	2,292	1,700
Weighted-average shares used in computing basic and diluted net income per share	79,001	77,286	75,182

Accumulated Other Comprehensive Income (Loss)

Accumulated other comprehensive income (loss) ("OCI") includes the following items, the impact of which has been excluded from earnings and reflected as components of stockholders' equity as shown below (in thousands):

	December 26, 2020	December 28, 2019
Unrealized losses on available-for-sale marketable securities	$ (126)	$ (352)
Translation adjustments and other	5,184	53
Unrealized gains (losses) on derivative instruments	828	(360)
Accumulated other comprehensive income (loss)	$ 5,886	$ (659)

Note 3—Balance Sheet Components

Marketable Securities

Marketable securities consisted of the following (in thousands):

December 26, 2020	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. Treasuries	$ 40,602	$ 124	$ —	$ 40,726
Corporate bonds	24,156	176	(2)	24,330
Certificate of deposit	2,160	19	—	2,179
Agency securities	575	—	—	575
	$ 67,493	$ 319	$ (2)	$ 67,810

December 28, 2019	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. Treasuries	$ 10,458	$ 11	$ —	$ 10,469
Commercial paper	3,914	1	(4)	3,911
Corporate bond	33,867	68	(7)	33,928
Certificate of deposit	3,584	5	—	3,589
Agency securities	24,408	38	(16)	24,430
	$ 76,231	$ 123	$ (27)	$ 76,327

We classify our marketable securities as available-for-sale. All marketable securities represent the investment of funds available for current operations, notwithstanding their contractual maturities. Such marketable securities are recorded at fair value and unrealized gains and losses are recorded in Accumulated other comprehensive income (loss) until realized.

We typically invest in highly-rated securities with low probabilities of default. Our investment policy requires investments to be rated single A or better, limits the types of acceptable investments, concentration as to security holder and duration of the investment. The gross unrealized gains and losses in fiscal 2020 and 2019 were caused primarily by changes in interest rates.

The longer the duration of marketable securities, the more susceptible they are to changes in market interest rates and bond yields. As yields increase, those securities with a lower yield-at-cost show a mark-to-market unrealized loss. We anticipate recovering the full cost of the securities either as market conditions improve, or as the securities mature. Accordingly, we believe that the unrealized losses are not as a result of a credit loss. As of December 26, 2020 and December 28, 2019, gross unrealized losses related to our marketable securities portfolio were not material.

The contractual maturities of marketable securities were as follows (in thousands):

	December 26, 2020		December 28, 2019	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Due in one year or less	$ 50,500	$ 50,679	$ 38,899	$ 38,944
Due after one year to five years	16,993	17,131	37,332	37,383
	$ 67,493	$ 67,810	$ 76,231	$ 76,327

See also Note 8, *Fair Value*.

Inventories, net

Inventories consisted of the following (in thousands):

	December 26, 2020	December 28, 2019
Raw materials	$ 48,122	$ 38,528
Work-in-progress	30,806	29,720
Finished goods	20,301	15,010
	$ 99,229	$ 83,258

Property, Plant and Equipment, net

Property, plant and equipment, net consisted of the following (in thousands):

	December 26, 2020	December 28, 2019
Land	$ 4,751	$ —
Machinery and equipment	226,185	201,861
Computer equipment and software	36,361	35,192
Furniture and fixtures	6,894	6,756
Leasehold improvements	79,144	76,081
Sub-total	353,335	319,890
Less: Accumulated depreciation and amortization	(294,468)	(273,001)
Net property, plant and equipment	58,867	46,889
Construction-in-progress	45,236	11,858
Total	$ 104,103	$ 58,747

Accrued Liabilities

Accrued liabilities consisted of the following (in thousands):

	December 26, 2020	December 28, 2019
Accrued compensation and benefits	$ 33,110	$ 21,329
Accrued employee stock purchase plan contributions withheld	4,240	3,331
Accrued warranty	3,918	1,942
Accrued income and other taxes	6,976	6,846
Accrued contingent consideration	4,012	—
Other accrued expenses	3,086	2,991
	$ 55,342	$ 36,439

Note 4—Acquisitions

High Precision Devises, Inc. Acquisition

On October 19, 2020, we acquired 100% of the shares of HPD for total consideration of $16.9 million, net of cash acquired of $1.7 million, which included an estimated adjustment for changes in working capital, which are not yet finalized. This acquisition brings highly specialized skills and know-how to address the unique test challenges within the emerging quantum computing, superconducting computing, and ultra-sensitive sensor markets which operate at temperatures as low as 30 millikelvin.

The acquisition was accounted for using the acquisition method of accounting, with FormFactor treated as the acquirer. The acquired assets and liabilities of HPD were recorded at their respective fair values including an amount for goodwill representing the difference between the acquisition consideration and the fair value of the identifiable net assets.

Our Consolidated Statements of Income include the financial results of HPD subsequent to the acquisition date of October 19, 2020. Revenue related to HPD since the acquisition date that was included in our Consolidated Statements of Income for fiscal 2020 was not material.

The acquisition price was allocated to the tangible and identified intangible assets acquired and liabilities assumed as of the closing date of the acquisition based upon their respective fair values. The fair values assigned to assets acquired and liabilities assumed were based on management's assumptions as of the reporting date.

As of the reporting date, we have not completed the valuation of assets acquired and liabilities assumed. While the quantification of identifiable intangible assets is still in process, we expect certain amounts provisionally recorded as goodwill to be allocated to such assets as customer relationships, developed technologies, backlog and potentially other technology-related assets as we complete purchase accounting. While we have recorded a provisional allocation of value based on the best estimates available at this time, we do not yet have a final allocation of value between amortizing and non-amortizing intangible assets. The items pending include finalizing our evaluation of acquired tangible and financial assets, finalizing the working capital adjustment under the purchase agreement, and finalizing certain key assumptions used to value intangible assets. We expect that some amount of intangible assets provisionally recorded as goodwill may ultimately be allocated to an amortizing intangible asset or vice versa, and similarly the relative values of intangible assets may change as the valuation is finalized. We have recorded estimated amortization based on these provisional amounts from the acquisition date through December 26, 2020. To the extent that upon finalization the required amortization changes, we will record an adjustment to appropriately reflect amortization of the related assets between the acquisition date and the date at which the amounts become estimable. We have one year over which to finalize purchase accounting, and while we expect to complete purchasing accounting before that time, the impact of the potential changes to estimated amounts or related amortization to the financial statements as a whole is not expected to be material.

As described above, adjustments to fair value for intangible assets have not yet been finalized, however provisional amounts are included in the table below and in the Consolidated Balance Sheets and are subject to revision as the fair value of the associated assets acquired and liabilities assumed is finalized. The total estimated purchase price allocated to the underlying assets acquired and liabilities assumed based on the provisional amounts are as follows (in thousands):`

	Amount
Cash and cash equivalents	$ 1,680
Accounts receivable	1,017
Inventory	3,047
Property, plant and equipment	669
Operating lease, right-of-use-assets	2,554
Prepaid expenses and other assets	599
Tangible assets acquired	9,566
Deferred revenue	(2,393)
Accounts payable and accrued liabilities	(1,268)
Operating lease liabilities	(2,554)
Deferred tax liability	(3,465)
Total net tangible assets acquired and liabilities assumed	(114)
Intangible assets	14,020
Goodwill	4,654
Net assets acquired	$ 18,560

The preliminary intangible assets as of the closing date of the acquisition included (in thousands):

	Amount	Weighted Average Useful Life (in years)
Developed technologies	$ 8,000	10.0
Customer relationships	5,400	5.0
Order backlog	400	0.5
Trade names	220	5.0
Total intangible assets	$ 14,020	7.7

The fair value of the intangible assets acquired in connection with the acquisition was determined using either the income, market or replacement cost methodologies. The intangible assets are being amortized over periods which reflect the pattern in which economic benefits of the assets are expected to be realized.

Identifiable Intangible Assets
Valuation of intangible assets involves multiple assumptions. The key assumptions are described below.

Developed technology acquired primarily consists of existing technology related to cryogenic probe stations, Adiabatic Demagnetization Refrigerator ("ADR"), and continuous ADR cryostats and similar tools, and technology related to other cryogenic applications. We valued the developed technology using the multi-period excess earnings method under the income approach. Using this approach, the estimated fair values were calculated using expected future cash flows from specific products discounted to their net present values at an appropriate risk-adjusted rate of return.

Customer relationships represent the fair value of future projected revenues that will be derived from the sale of products to HPD's existing customers. We valued customer relationships using the incremental cash flow method. This method estimates value based on the incremental cash flow afforded by having the customers relationships in place on the acquisition date versus having no relationships in place and needing to replicate or replace those relationships. The incremental cash flows are then discounted to a present value to arrive at an estimate of fair value for this asset class.

Order backlog represents business under existing contractual obligations. Expected cash flow from order backlog was valued on a discounted direct cash flow basis, net of returns on contributory assets such as working capital, property and equipment, trade name and assembled workforce.

The identified trade names intangibles relate to the estimated fair value of future cash flows related to the HPD brand. We valued trade names by applying the relief-from-royalty method under the income approach. This method is based on the application of a royalty rate to forecasted revenue under the trade name.

Goodwill
The excess of purchase price over the fair value assigned to the assets acquired and liabilities assumed represents the amount of goodwill resulting from the acquisition. We believe the factors that contributed to goodwill include synergies that are specific to our consolidated business, such as cost savings and operational efficiencies, and the acquisition of a talented workforce that expands our expertise in business development and commercializing semiconductor test products, none of which qualify for recognition as a separate intangible asset. We do not expect any portion of this goodwill to be deductible for tax purposes. The goodwill attributable to the acquisition was recorded as a non-current asset and is not amortized, but is subject to an annual review for impairment.

The goodwill arising from the acquisition was allocated to the HPD reporting unit within the Systems reportable segment.

We have not presented unaudited combined pro forma financial information as the HPD acquisition was not significant to our consolidated results of operations and financial position.

Baldwin Park Acquisition
On July 30, 2020, we acquired the probe card assets of Advantest Corporation for total cash consideration of $35.0 million. This acquisition brings important enabling technologies and capabilities for designing and manufacturing advanced probe cards, and adds a complementary 3D-NAND Flash probe-card product that is qualified and in production at one of the world's leading NAND Flash manufacturers.

The acquisition was accounted for using the acquisition method of accounting, with FormFactor treated as the acquirer. The acquired assets and liabilities of Baldwin Park were recorded at their respective fair values including an amount for goodwill representing the difference between the acquisition consideration and the fair value of the identifiable net assets.

Our Consolidated Statements of Income include the financial results of Baldwin Park subsequent to the acquisition date of July 30, 2020. Revenue related to Baldwin Park since the acquisition date that was included in our Consolidated Statements of Income for fiscal 2020 was not material.

The acquisition price was allocated to the tangible and identified intangible assets acquired and liabilities assumed as of the closing date of the acquisition based upon their respective fair values. The fair values assigned to assets acquired and liabilities assumed were based on management's assumptions as of the reporting date. Our purchase accounting remains open as of the reporting date, subject to finalization of the fair value of certain acquired assets and liabilities. The item pending includes finalizing certain key assumptions used to value intangible assets. The estimated fair value of assets acquired, including goodwill and intangibles, and liabilities assumed for the purchase as follows (in thousands):

	Amount
Accounts receivable	$ 4,365
Inventory	2,579
Property, plant and equipment	9,053
Operating lease, right-of-use-assets	519
Prepaid expenses and other assets	56
Tangible assets acquired	16,572
Accounts payable and accrued liabilities	(743)
Operating lease liabilities	(519)
Total net tangible assets acquired and liabilities assumed	15,310
Intangible assets	14,100
Goodwill	5,590
Net assets acquired	$ 35,000

The preliminary intangible assets as of the closing date of the acquisition included (in thousands):

	Amount	Weighted Average Useful Life (in years)
Developed technologies	$ 10,400	10.0
Customer relationships	3,300	3.0
In-process research and development	400	N/A
Total intangible assets	$ 14,100	8.3

Indications of fair value of the intangible assets acquired in connection with the acquisition were determined using either the income, market or replacement cost methodologies. The intangible assets are being amortized over periods which reflect the pattern in which economic benefits of the assets are expected to be realized.

Identifiable Intangible Assets

Valuation of intangible assets involves multiple assumptions. The key assumptions are described below.

Developed technology acquired consists of existing technology related to 3D NAND Flash probe cards and the value of cost savings expected to be derived from Low Temperature Co-fired Ceramic ("LTCC") technology. We valued the developed technology related to 3D NAND Flash using the multi-period excess earnings method under the income approach. Using this approach, the estimated fair values were calculated using expected future cash flows from specific products discounted to their net present values at an appropriate risk-adjusted rate of return. We valued the LTCC developed technology asset using the incremental cash flow method. This method estimates value based on the incremental cash flow afforded by having the LTCC capability in place on the acquisition date versus having no capability in place and needing to replicate or replace that capability. The incremental cash flows are then discounted to a present value to arrive at an estimate of fair value for this asset class.

In-process research and development acquired primarily consists of research and development projects that were in process at the time of acquisition related to technologies used in DRAM probe cards. Once these projects are complete they will be placed in developed technologies and amortized over its useful life. We valued the IPR&D using the multi-period excess earnings method under the income approach. Using this approach, the estimated fair values were calculated using expected future cash flows from specific products discounted to their net present values at an appropriate risk-adjusted rate of return.

Customer relationships represent the fair value of future projected revenues that will be derived from the sale of products to Baldwin Park's existing customers. We valued customer relationships using the incremental cash flow method. This method estimates value based on the incremental cash flow afforded by having the customers relationships in place on the acquisition date versus having no relationships in place and needing to replicate or replace those relationships. The incremental cash flows are then discounted to a present value to arrive at an estimate of fair value for this asset class.

Goodwill
The excess of purchase price over the fair value assigned to the assets acquired and liabilities assumed represents the amount of goodwill resulting from the acquisition. We believe the factors that contributed to goodwill include synergies that are specific to our consolidated business, such as cost savings and operational efficiencies, and the acquisition of a talented workforce that expands our expertise in business development, none of which qualify for recognition as a separate intangible asset. We expect this goodwill to be deductible for tax purposes. The goodwill attributable to the acquisition was recorded as a non-current asset and is not amortized, but is subject to an annual review for impairment.

The goodwill arising from the acquisition was allocated to the Probe Cards reporting unit within the Probe Cards reportable segment.

We have not presented unaudited combined pro forma financial information as the Baldwin Park acquisition was not significant to our consolidated results of operations and financial position.

FRT GmbH Acquisition
On October 9, 2019, we acquired 100% of the shares of FRT, a German-based company, for total consideration of $26.9 million, net of cash acquired of $1.7 million. The fair value of the purchase consideration was comprised of a $22.2 million cash payment and $6.5 million of contingent consideration. The contingent consideration is a cash amount equal to 1.5x Earnings Before Interest and Tax ("EBIT") as defined in the purchase agreement, from a minimum of zero up to a maximum of €10.3 million, payable subject to the performance of the acquired business in calendar 2020. We estimated the fair value of contingent consideration using a probability weighted approach. Key assumptions in determining the fair value of contingent consideration include estimating the probability of achieving certain EBIT levels and discounting at an appropriate discount rate. See Note 8, *Fair Value,* for additional information. This acquisition strengthens our leadership in test and measurement by expanding our addressable market into 3D hybrid surface metrology and extending the optical applications scope of our existing Systems segment.

The acquisition was accounted for using the acquisition method of accounting, with FormFactor treated as the acquirer. The acquired assets and liabilities of FRT were recorded at their respective fair values including an amount for goodwill representing the difference between the acquisition consideration and the fair value of the identifiable net assets.

Our Consolidated Statements of Income include the financial results of FRT subsequent to the acquisition date of October 9, 2019. Revenue in fiscal 2019 related to FRT subsequent to the acquisition date that was included in our Consolidated Statements of Income was not material.

Separate from the purchase agreement, we entered into a term loan agreement with a lender for an aggregate amount of $23.4 million to finance the acquisition. See Note 5, *Debt*, for additional information.

The acquisition price was allocated to the tangible and identified intangible assets acquired and liabilities assumed as of the closing date of the acquisition based upon their respective fair values. The fair values assigned to assets acquired and liabilities assumed were based on management’s assumptions as of the reporting date. We have finalized our allocation of the assets acquired, including goodwill and intangibles, and liabilities assumed for the purchase as follows (in thousands):

	Amount
Cash and cash equivalents	$ 1,687
Accounts receivable	3,079
Inventory	2,643
Property, plant and equipment	696
Operating lease, right-of-use-assets	335
Prepaid expenses and other assets	838
Tangible assets acquired	9,278
Customer deposits	(1,933)
Accounts payable and accrued liabilities	(1,182)
Operating lease liabilities	(335)
Deferred tax liabilities	(5,757)
Total net tangible assets acquired and liabilities assumed	71
Intangible assets	17,429
Goodwill	11,123
Net assets acquired	$ 28,623

The intangible assets as of the closing date of the acquisition included (in thousands):

	Amount	Weighted Average Useful Life (in years)
Developed technologies	$ 12,505	8.0
Customer relationships	3,071	6.0
Order backlog	1,645	0.5
Trade names	208	2.0
Total intangible assets	$ 17,429	6.9

Indications of fair value of the intangible assets acquired in connection with the acquisition were determined using either the income, market or replacement cost methodologies. The intangible assets are being amortized over periods which reflect the pattern in which economic benefits of the assets are expected to be realized.

Identifiable Intangible Assets

Valuation of intangible assets involves multiple assumptions. The key assumptions are described below.

Developed technology acquired primarily consists of existing technology related to hybrid 3D surface metrology measurement equipment. We valued the developed technology using the multi-period excess earnings method under the income approach. Using this approach, the estimated fair values were calculated using expected future cash flows from specific products discounted to their net present values at an appropriate risk-adjusted rate of return.

Customer relationships represent the fair value of future projected revenues that will be derived from the sale of products to FRT's existing customers. We valued customer relationships using the incremental cash flow method. This method estimates value based on the incremental cash flow afforded by having the customers relationships in place on the acquisition date versus having no relationships in place and needing to replicate or replace those relationships. The incremental cash flows are then discounted to a present value to arrive at an estimate of fair value for this asset class.

Order backlog represents business under existing contractual obligations. Expected cash flow from order backlog was valued on a direct cash flow basis.

The identified trade names intangibles relate to the estimated fair value of future cash flows related to the FRT brand. We valued trade names by applying the relief-from-royalty method under the income approach. This method is based on the application of a royalty rate to forecasted revenue under the trade name.

Goodwill
The excess of purchase price over the fair value assigned to the assets acquired and liabilities assumed represents the amount of goodwill resulting from the acquisition. We believe the factors that contributed to goodwill include synergies that are specific to our consolidated business, such as cost savings and operational efficiencies, and the acquisition of a talented workforce that expands our expertise in business development and commercializing semiconductor test products, none of which qualify for recognition as a separate intangible asset. We do not expect any portion of this goodwill to be deductible for tax purposes. The goodwill attributable to the acquisition was recorded as a non-current asset and is not amortized, but is subject to an annual review for impairment.

The goodwill arising from the acquisition was allocated to the FRT reporting unit within the Systems reportable segment.

We have not presented unaudited combined pro forma financial information as the FRT acquisition was not significant to our consolidated results of operations and financial position.

Note 5—Debt

Our debt consisted of the following (in thousands):

	December 26, 2020	December 28, 2019
Term loans	$ 34,569	$ 58,514
Less unamortized issuance costs	(75)	(29)
Term loans less issuance costs	$ 34,494	$ 58,485

CMI Term Loan
On June 24, 2016, we entered into a Credit Agreement (the “Credit Agreement”) with HSBC Bank USA, National Association ("HSBC"), as administrative agent, co-lead arranger, sole bookrunner and syndication agent, other lenders that may from time-to-time be a party to the Credit Agreement, and certain guarantors. Pursuant to the Credit Agreement, the lenders provided us with a senior secured term loan facility of $150 million (the “CMI Term Loan”). The proceeds of the CMI Term Loan were used to finance a portion of the purchase price paid in connection with the Cascade Microtech acquisition in fiscal 2016 and to pay related bank fees and expenses.

The CMI Term Loan bore interest at a rate equal to, at our option, (i) the applicable London Interbank Offered Rate ("LIBOR") rate plus 2.00% per annum or (ii) Base Rate (as defined in the Credit Agreement) plus 1.00% per annum. We elected to pay interest at 2.00% over the one-month LIBOR rate. Interest payments were payable in quarterly installments over a five-year period.

The principal payments on the CMI Term Loan were scheduled to be paid in equal quarterly installments that began June 30, 2016, in an annual amount equal to 5% for year one, 10% for year two, 20% for year three, 30% for year four and 35% for year five. We accelerated payments of these scheduled amounts and made the final payment on the CMI Term Loan on June 30, 2020, approximately one year before the original maturity. We are no longer subject to the terms of the Credit Agreement.

FRT Term Loan
On October 25, 2019, we entered into a euro denominated $23.4 million three-year credit facility loan agreement (the "FRT Term Loan") with HSBC Trinkaus & Burkhardt AG, Germany, to fund the acquisition of FRT GmbH, which we acquired on October 9, 2019. See Note 4, *Acquisitions*, for further details of the acquisition.

The FRT Term Loan bears interest at a rate equal to the Euro Interbank Offered Rate ("EURIBOR") plus 1.75 % per annum and will be repaid in quarterly installments of approximately $2.0 million plus interest. The interest rate at December 26, 2020 was 1.24%.

The obligations under the FRT Term Loan are fully and unconditionally guaranteed by FormFactor, Inc. The FRT Term Loan contains negative covenants customary for financing of this type, including covenants that place limitations on the incurrence of additional indebtedness, the creation of liens, the payment of dividends; dispositions; fundamental changes, including mergers and acquisitions; loans and investments; sale leasebacks; negative pledges; transactions with affiliates; changes in fiscal year; sanctions and anti-bribery laws and regulations, and modifications to charter documents in a manner materially adverse to the Lenders. The FRT Term Loan also contains affirmative covenants and representations and warranties customary for financing of this type. As of December 26, 2020, the balance outstanding pursuant to the FRT term loan was $17.1 million.

Building Term Loan

On June 22, 2020, we entered into an $18.0 million 15-year credit facility loan agreement (the “Building Term Loan”) with MUFG Union Bank, National Association ("Union Bank"). The proceeds of the Building Term Loan were used to purchase a building adjacent to our leased facilities in Livermore, California.

The Building Term Loan bears interest at a rate equal to the applicable LIBOR rate plus 1.75% per annum. Interest payments are payable in monthly installments over a fifteen-year period. The interest rate at December 26, 2020 was 1.90%.

On March 17, 2020, we entered into an interest rate swap agreement with Union Bank to hedge the interest payments on the Building Term Loan for the notional amount of $18.0 million. As future levels of LIBOR over the life of the loan are uncertain, we entered into this interest-rate swap agreement to hedge the exposure in interest rate risks associated with movement in LIBOR rates. By entering into the agreement, we convert a floating rate interest at one-month LIBOR plus 1.75% into a fixed rate interest at 2.75%. The interest rate swap also includes a 0% floor that is effective for one year from the date of the swap. As of December 26, 2020, the notional amount of the loan that is subject to this interest rate swap is $17.5 million. See Note 8, *Fair Value and Derivative Instruments*, for additional information.

The obligations under the Building Term Loan are guaranteed by a deed of trust covering certain real property and improvements and certain personal property used in connection therewith. The deed of trust creates a first priority lien or encumbrance on the property with only such exceptions as may be approved by the Union Bank in writing.

The Credit Agreement contains covenants customary for financing of this type. As of December 26, 2020, the balance outstanding pursuant to the Building Term Loan was $17.5 million.

Future principal and interest payments on our term loans as of December 26, 2020, based on the interest rate in effect at that date were as follows (in thousands):

	Payments Due In Fiscal Year						
	2021	2022	2023	2024	2025	2026 and thereafter	Total
Term loans - principal payments	$ 9,521	$ 9,549	$ 1,050	$ 1,080	$ 1,111	$ 12,258	$ 34,569
Term loans - interest payments[(1)]	503	377	290	271	248	1,185	2,874
	$ 10,024	$ 9,926	$ 1,340	$ 1,351	$ 1,359	$ 13,443	$ 37,443

[(1)] Represents our minimum interest payment commitments at 1.24% per annum for the FRT Term Loan and 1.90% per annum for the Building Term Loan.

Note 6—Leases

We adopted Accounting Standards Update ("ASU") 2016-02, “*Leases (Topic 842)*,” ASU 2018-10, “*Codification Improvements to Topic 842, Leases*,” ASU 2018-11, “*Leases (Topic 842): Targeted Improvements*,” and ASU 2019-01, “*Leases (Topic 842): Codification Improvements*," on December 30, 2018, the first day of fiscal 2019, using the modified transition approach. The modified transition approach permitted a company to use its effective date as the date of initial application and to apply the standard to its leases, and, therefore, not restate comparative prior period financial information. Consequently, prior period financial information is not updated, and the disclosures required under the new standard are not provided for the period before December 30, 2018.

Our operating lease, right-of-use assets relate to real estate space under non-cancelable operating lease agreements for commercial and industrial space, as well as for our corporate headquarters located in Livermore, California. Our leases have remaining terms of 1 to 8 years, and some leases include options to extend up to 20 years. We also have operating leases for automobiles with remaining lease terms of 1 to 3 years. We did not include any of our renewal options in our lease terms for calculating our lease liability as the renewal options allow us to maintain operational flexibility and we are not reasonably certain we will exercise these options at this time. The weighted-average remaining lease term for our operating leases was 6.6 years at December 26, 2020 and the weighted-average discount rate was 4.33%.

The components of lease expense were as follows (in thousands):

	Lease Expense	
	December 26, 2020	December 28, 2019
Operating lease expense	$ 7,468	$ 6,985
Short-term lease expense	136	142
Variable lease expense	1,574	1,286
	$ 9,178	$ 8,413

Operating lease expense for the year ended December 29, 2018 was $8.4 million.

Future minimum payments under our non-cancelable operating leases were as follows as of December 26, 2020 (in thousands):

Fiscal Year	Amount
2021	$ 7,349
2022	6,115
2023	5,254
2024	4,903
2025	4,863
Thereafter	12,531
Total minimum lease payments	41,015
Less: interest	(6,315)
Present value of net minimum lease payments	34,700
Less: current portion	(6,704)
Total long-term operating lease liabilities	$ 27,996

Note 7—Derivative Financial Instruments

Foreign Exchange Derivative Contracts

We operate and sell our products in various global markets. As a result, we are exposed to changes in foreign currency exchange rates. We utilize foreign currency forward contracts to hedge against future movements in foreign exchange rates that affect certain existing foreign currency denominated assets and liabilities and forecasted foreign currency revenue and expense transactions. Under this program, our strategy is to have increases or decreases in our foreign currency exposures mitigated by gains or losses on the foreign currency forward contracts in order to mitigate the risks and volatility associated with foreign currency transaction gains or losses.

We do not use derivative financial instruments for speculative or trading purposes. For accounting purposes, certain of our foreign currency forward contracts are not designated as hedging instruments and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Consolidated Balance Sheets with changes in fair value recorded within Other income (expense), net in our Consolidated Statements of Income for both realized and unrealized gains and losses. Certain of our foreign currency forward contracts are designated as cash flow hedges, and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Consolidated Balance Sheets with changes in fair value recorded as a component of Accumulated other comprehensive income (loss) and reclassified into earnings in the same period in which the hedged transaction affects earnings, and in the same line item on the Consolidated Statements of Income as the impact of the hedge transaction. At December 26, 2020, we expect to reclassify $0.9 million of the amount accumulated in other comprehensive income (loss) to earnings during the next 12 months, due to the recognition in earnings of the hedged forecasted transactions.

The fair value of our foreign exchange derivative contracts was determined based on current foreign currency exchange rates and forward points. All of our foreign exchange derivative contracts outstanding at December 26, 2020 will mature by the fourth quarter of fiscal 2021.

The following table provides information about our foreign currency forward contracts outstanding as of December 26, 2020 (in thousands):

Currency	Contract Position	Contract Amount (Local Currency)	Contract Amount (U.S. Dollars)
Euro	Buy	(11,350)	$ (13,019)
Euro	Sell	12,304	15,002
Japanese Yen	Sell	1,707,934	16,479
Korean Won	Sell	2,309,079	2,093
Total USD notional amount of outstanding foreign exchange contracts			$ 20,555

Our foreign currency contracts are classified within Level 2 of the fair value hierarchy as they are valued using pricing models that utilize observable market inputs.

The location and amount of gains (losses) related to non-designated derivative instruments in the Consolidated Statements of Income were as follows (in thousands):

		Fiscal Year Ended		
Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized on Derivatives	December 26, 2020	December 28, 2019	December 29, 2018
Foreign exchange forward contracts	Other income (expense), net	$ (1,437)	$ 248	$ 906

The location and amount of gains (losses) related to derivative instruments designated as cash flow hedges on our Consolidated Statements of Income was as follows (in thousands):

	Amount of Gain or (Loss) Recognized in Accumulated OCI on Derivative	Location of Gain or (Loss) Reclassified from Accumulated OCI into Income	Amount of Gain or (Loss) Reclassified from Accumulated OCI into Income
Fiscal 2020	1,142	Cost of revenues	$ 89
		Research and development	77
		Selling, general and administrative	25
			$ 191
Fiscal 2019	$ 93	Cost of revenues	$ (526)
		Research and development	(75)
		Selling, general and administrative	(172)
			(773)

Interest Rate Swaps

Pursuant to our interest rate and risk management strategy, during fiscal 2016 we entered into an interest rate swap agreement with HSBC and other lenders to hedge the interest payments on the Term Loan for the notional amount of $95.6 million. As future levels of LIBOR over the life of the loan are uncertain, we entered into these interest-rate swap agreements to hedge the exposure in interest rate risks associated with the movement in LIBOR rates. By entering into the agreements, we converted a floating rate interest at one-month LIBOR plus 2.00% into a fixed rate interest at 2.94%. The interest rate swap agreement ended as of March 28, 2020.

During fiscal 2020 we entered into an interest rate swap agreement with Union Bank to hedge the interest payments on the Building Term Loan for the notional amount of $18.0 million. As future levels of LIBOR over the life of the loan are uncertain, we entered into this interest-rate swap agreement to hedge the exposure in interest rate risks associated with movement in LIBOR rates. By entering into the agreement, we convert a floating rate interest at one-month LIBOR plus 1.75% into a fixed rate interest at 2.75%. The interest rate swap also includes a 0% floor that is effective for one year from the date of the swap. As of December 26, 2020, the notional amount of the loan that is subject to this interest rate swap was $17.5 million. See Note 5, *Debt*, for additional information.

For accounting purposes, the interest-rate swap contracts qualify for and are designated as cash flow hedges. All hedging relationships are formally documented, and the hedges are designed to offset changes to future cash flows on hedged transactions. We evaluate hedge effectiveness at hedge inception and on an ongoing basis.

The fair value of our interest rate swap contracts is determined at the end of each reporting period based on valuation models that use interest rate yield curves as inputs. For accounting purposes, our interest rate swap contracts qualify for, and are designated as, cash flow hedges. The cash flows associated with the interest rate swaps are reported in Net cash provided by operating activities in our Consolidated Statements of Cash Flows and the fair value of the interest rate swap contracts are recorded within Accrued Liabilities and Other assets.

The impact of the interest rate swaps on the Consolidated Statements of Income was as follows (in thousands):

	Amount of Gain or (Loss) Recognized in OCI on Derivative (Effective Portion)	Location of Gain or (Loss) Reclassified from Accumulated OCI into Income (Effective Portion)	Amount of Gain or (Loss) Reclassified from Accumulated OCI into Income (Effective Portion)
Fiscal 2020	$ (119)	Other income (expense), net	$ (64)
Fiscal 2019	$ (86)	Other income (expense), net	$ 548
Fiscal 2018	$ 340	Other income (expense), net	$ 721

See also Note 8, *Fair Value*.

Note 8—Fair Value

Whenever possible, the fair values of our financial assets and liabilities are determined using quoted market prices of identical securities or quoted market prices of similar securities from active markets. The three levels of inputs that may be used to measure fair value are as follows:

- Level 1 valuations are obtained from real-time quotes for transactions in active exchange markets involving identical securities;
- Level 2 valuations utilize significant observable inputs, such as quoted prices for similar assets or liabilities, quoted prices near the reporting date in markets that are less active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; and
- Level 3 valuations utilize unobservable inputs to the valuation methodology and include our own data about assumptions market participants would use in pricing the asset or liability based on the best information available under the circumstances.

We did not have any transfers of assets or liabilities measured at fair value on a recurring basis to or from Level 1, Level 2 or Level 3 during fiscal 2020, 2019 or 2018.

The carrying values of Cash, Accounts receivable, net, Restricted cash, Prepaid expenses and other current assets, Accounts payable, Accrued liabilities, and Current portion of term loans, net of unamortized issuance costs approximate fair value due to their short maturities.

No changes were made to our valuation techniques during fiscal 2020.

Cash Equivalents
The fair value of our cash equivalents is determined based on quoted market prices for similar or identical securities.

Marketable Securities
We classify our marketable securities as available-for-sale and value them utilizing a market approach. Our investments are priced by pricing vendors who provide observable inputs for their pricing without applying significant judgment. Broker pricing is used mainly when a quoted price is not available, the investment is not priced by our pricing vendors or when a broker price is more reflective of fair value. Our broker-priced investments are categorized as Level 2 investments because fair value is based on similar assets without applying significant judgments. In addition, all of our investments have a sufficient level of trading volume to demonstrate that the fair value is appropriate.

Contingent Consideration
Contingent consideration, arising from the acquisition of FRT (see Note 4, *Acquisitions*), is a cash amount equal to 1.5x EBIT as defined in the purchase agreement, up to a maximum of €10.3 million, payable subject to the performance of the acquired

business in calendar 2020. We originally estimated the fair value of contingent consideration at acquisition using a probability weighted approach. Key assumptions in determining the fair value of contingent consideration included estimating the probability of achieving certain EBIT levels and discounting at an appropriate discount rate. Based on actual results during the earnout period, contingent consideration as of December 26, 2020 was estimated to be $4.0 million, a net decrease of $1.4 million from $5.4 million as of December 28, 2019.

Assets and liabilities Measured at Fair Value on a Recurring Basis

Assets and liabilities measured at fair value on a recurring basis were as follows (in thousands):

December 26, 2020	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets:				
Cash equivalents:				
Money market funds	$ 43,019	$ —	$ —	$ 43,019
Marketable securities:				
U.S. Treasuries	40,726	—	—	40,726
Certificates of deposit	—	2,179	—	2,179
Agency securities	—	575	—	575
Corporate bonds	—	24,330	—	24,330
	40,726	27,084	—	67,810
Foreign exchange derivative contracts	—	1,057	—	1,057
Interest rate swap derivative contracts	—	57	—	57
Total assets	$ 83,745	$ 28,198	$ —	$ 111,943
Liabilities:				
Foreign exchange derivative contracts	$ —	$ —	$ —	$ —
Interest rate swap derivative contracts	—	(87)	—	(87)
Contingent consideration	—	—	(4,012)	(4,012)
Total liabilities	$ —	$ (87)	$ (4,012)	$ (4,099)

December 28, 2019	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets:				
Cash equivalents:				
Money market funds	$ 17,056	$ —	$ —	$ 17,056
Marketable securities:				
U.S. Treasuries	10,468	—	—	10,468
Certificates of deposit	—	3,590	—	3,590
Agency securities	—	24,430	—	24,430
Corporate bonds	—	33,928	—	33,928
Commercial paper	—	3,911	—	3,911
	10,468	65,859	—	76,327
Foreign exchange derivative contract	—	41	—	41
Interest rate swap derivative contracts	—	26	—	26
Total assets	$ 27,524	$ 65,926	$ —	$ 93,450
Liabilities:				
Foreign exchange derivative contracts	$ —	$ (240)	$ —	$ (240)
Contingent consideration	—	—	(5,364)	(5,364)
Total liabilities	$ —	$ (240)	$ (5,364)	$ (5,604)

Assets and Liabilities Measured at Fair Value on a Non-Recurring Basis

We measure and report our non-financial assets such as Property, plant and equipment, Goodwill and Intangible assets at fair value on a non-recurring basis if we determine these assets to be impaired or in the period when we make a business acquisition. Other than as discussed in Note 4, *Acquisitions*, there were no assets or liabilities measured at fair value on a nonrecurring basis during fiscal 2020, 2019 or 2018.

Note 9—Goodwill and Intangible Assets

Goodwill

Goodwill by reportable segment was as follows (in thousands):

	Probe Cards	Systems	Total
Goodwill, gross, as of December 30, 2017	$ 172,482	$ 17,438	$ 189,920
Foreign currency translation	—	(706)	(706)
Goodwill, gross, as of December 29, 2018	172,482	16,732	189,214
Addition - FRT acquisition	—	10,148	10,148
Foreign currency translation	—	(166)	(166)
Goodwill, gross, as of December 28, 2019	172,482	26,714	199,196
Addition - FRT acquisition	—	975	975
Addition - Baldwin Park acquisition	5,590	—	5,590
Addition - HPD acquisition	—	4,654	4,654
Foreign currency translation	—	2,346	2,346
Goodwill, gross, as of December 26, 2020	$ 178,072	$ 34,689	$ 212,761

We have not recorded any goodwill impairments as of December 26, 2020.

Intangible Assets

Intangible assets were as follows (in thousands):

	December 26, 2020			December 28, 2019		
Other Intangible Assets	**Gross**	**Accumulated Amortization**	**Net**	**Gross**	**Accumulated Amortization**	**Net**
Existing developed technologies	$ 176,265	$ 137,754	$ 38,511	$ 154,951	$ 116,138	$ 38,813
Trade name	8,162	7,363	799	7,816	6,976	840
Customer relationships	52,488	33,378	19,110	44,229	27,057	17,172
Backlog	2,227	1,900	327	1,676	891	785
In-process research and development	400	—	400	—	—	—
	$ 239,542	$ 180,395	$ 59,147	$ 208,672	$ 151,062	$ 57,610

Amortization expense was included in our Consolidated Statements of Income as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	**December 28, 2019**	**December 29, 2018**
Cost of revenues	$ 21,609	$ 20,036	$ 20,530
Selling, general and administrative	6,382	7,636	8,843
	$ 27,991	$ 27,672	$ 29,373

The estimated future amortization of definite-lived intangible assets, excluding in-process research and development, is as follows (in thousands):

Fiscal Year	Amount
2021	$ 20,207
2022	10,594
2023	8,364
2024	5,951
2025	4,398
Thereafter	9,233
Total	$ 58,747

We did not record any impairment of intangible assets in fiscal 2020, 2019 and 2018.

Note 10—Commitments and Contingencies

Leases

See Note 6, *Leases*.

Environmental Matters

We are subject to U.S. federal, state, local, and foreign governmental laws and regulations relating to the protection of the environment, including those governing the discharge of pollutants into the air and water, the management and disposal of hazardous substances and wastes, the clean-up of contaminated sites and the maintenance of a safe workplace. We believe that we comply in all material respects with the environmental laws and regulations that apply to us. We did not receive any notices of violations of environmental laws and regulations in fiscal 2020, 2019 or 2018. In the future, we may receive notices of violations of environmental regulations, or otherwise learn of such violations. Environmental contamination or violations may negatively impact our business.

Indemnification Arrangements

We have entered, and may from time to time in the ordinary course of our business enter, into contractual arrangements with third parties that include indemnification obligations. Under these contractual arrangements, we have agreed to defend, indemnify and/or hold the third party harmless from and against certain liabilities. These arrangements include indemnities in favor of customers in the event that our products or services infringe a third party's intellectual property or cause property or other indemnities in favor of our lessors in connection with facility leasehold liabilities that we may cause. In addition, we have entered into indemnification agreements with our directors and certain of our officers, and our bylaws contain indemnification obligations in favor of our directors, officers and agents. These indemnity arrangements may limit the type of the claim, the total amount that we can be required to pay in connection with the indemnification obligation and the time within which an indemnification claim can be made. The duration of the indemnification obligation may vary, and for most arrangements, survives the agreement term and is indefinite. We believe that substantially all of our indemnity arrangements provide either for limitations on the maximum potential future payments we could be obligated to make, or for limitations on the types of claims and damages we could be obligated to indemnify, or both. However, it is not possible to determine or reasonably estimate the maximum potential amount of future payments under these indemnification obligations due to the varying terms of such obligations, a lack of history of prior indemnification claims, the unique facts and circumstances involved in each particular contractual arrangement and in each potential future claim for indemnification, and the contingency of any potential liabilities upon the occurrence of events that are not reasonably determinable. We have not had any material requests for indemnification under these arrangements. We have not recorded any liabilities for these indemnification arrangements on our Consolidated Balance Sheets as of December 26, 2020 or December 28, 2019.

Legal Matters

From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. As of December 26, 2020, and as of the filing of these financial statements, we were not involved in any material legal proceedings. In the future, we may become a party to additional legal proceedings that may require us to spend significant resources. Litigation can be expensive and disruptive to normal business operations. The results of legal proceedings are difficult to predict, and the costs incurred in litigation can be substantial, regardless of outcome.

Note 11—Stockholders' Equity

Preferred Stock

We have authorized 10,000,000 shares of undesignated preferred stock, $0.001 par value, none of which is issued and outstanding. Our Board of Directors shall determine the rights, preferences, privileges and restrictions of the preferred stock, including dividends rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of any series.

Common Stock

Each share of common stock has the right to one vote. The holders of common stock are also entitled to receive dividends whenever funds are legally available and when declared by the Board of Directors, subject to the prior rights of holders, if any, of all classes of stock outstanding having priority rights as to dividends. No dividends have been declared or paid as of December 26, 2020.

Common Stock Repurchase Program

On October 26, 2020, our Board of Directors authorized a program to repurchase up to $50 million of outstanding common stock to offset potential dilution from issuances of common stock under our stock-based incentive plans. The share repurchase program will expire October 28, 2022. This repurchase program replaced the previous repurchase program that expired in February 2020 to purchase up to $25.0 million of outstanding common stock. During fiscal 2020, 2019 and 2018, we did not repurchase any shares.

Equity Incentive Plan

We currently grant equity-based awards under our Equity Incentive Plan, as amended (the "2012 Plan") which was approved by our stockholders. As amended, the 2012 Plan has authorized for issuance a total of 16.8 million shares, 6.0 million of which were available for grant as of December 26, 2020.

RSUs granted under the 2012 Plan generally vest over three years in annual tranches, though we have granted, and will continue to grant, such awards that vest over a shorter term for employee retention purposes.

The 2012 Plan provides that incentive stock options may be granted to our employees and nonqualified stock options, and all awards other than incentive stock options, may be granted to employees, directors and consultants. The exercise price of incentive stock options must be at least equal to the fair market value of our common stock on the date of grant. All restricted stock units and options granted under the 2012 Plan generally vest over three years and expire after seven years, unless otherwise determined by the Compensation Committee of the Board of Directors.

Stock Options

Stock option activity was as follows:

	Outstanding Options			
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
Outstanding at December 28, 2019	361,769	$ 8.35		
Options exercised	(255,769)	8.35		
Outstanding at December 26, 2020	106,000	$ 8.35	2.16	$ 3,627,900
Vested and expected to vest at December 26, 2020	106,000	$ 8.35	2.16	$ 3,627,900
Exercisable at December 26, 2020	106,000	$ 8.35	2.16	$ 3,627,900

Restricted Stock Units

RSUs, including Performance Restricted Stock Units ("PRSUs") are converted into shares of our common stock upon vesting on a one-for-one basis. The vesting of RSUs is subject to the employee's continuing service. RSU activity was as follows:

	Number of Shares	Weighted Average Grant Date Fair Value
Restricted stock units at December 28, 2019	3,069,000	$ 14.30
Granted	1,274,453	25.96
Vested	(1,453,378)	13.72
Canceled	(49,153)	15.70
Restricted stock units at December 26, 2020	2,840,922	19.80

The PRSUs granted in fiscal 2020, 2019 and 2018 listed below vest based on us achieving certain market performance criteria. The performance criteria are based on a metric called Total Shareholder Return ("TSR") for the performance period of three years, relative to the TSR of the companies identified as being part of the S&P Semiconductor Select Industry Index (FormFactor peer companies) as of a specific date.

Of the 333,000 PRSUs granted in fiscal 2017, 78,333 shares were forfeited, resulting in 255,000 shares vesting in fiscal 2020. These shares achieved the maximum 125% TSR performance, which resulted in an additional 63,750 shares issued in fiscal 2020 related to the fiscal 2017 PRSU grant.

PRSU grant activity was as follows:

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Grant Date	August 27, 2020	June 4, 2019	August 16, 2018
Performance period	July 1, 2020 - June 30, 2023	July 1, 2019 - June 30, 2022	July 1, 2018 - June 30, 2021
Number of shares	258,000	273,000	318,100
TSR as-of date	August 27, 2020	June 4, 2019	August 16, 2018
Stock-based compensation	$6.9 million	$4.4 million	$4.7 million

Employee Stock Purchase Plan

Our 2012 Employee Stock Purchase Plan (the "ESPP"), as amended, allows for the issuance of a total of 7,000,000 shares. The offering periods under the ESPP are 12 months commencing on February 1 of each calendar year and ending on January 31 of the subsequent calendar year, and a six-month fixed offering period commencing on August 1 of each calendar year and ending on January 31 of the subsequent calendar year. The 12-month offering period consists of two six-month purchase periods and the six-month offering period consists of one six-month purchase period. The price of the common stock purchased is 85% of the lesser of the fair market value of the common stock on the first day of the applicable offering period or the last day of each purchase period.

During fiscal 2020, employees purchased 485,566 shares under this program at a weighted average exercise price of $16.47 per share, which represented a weighted average discount of $11.00 per share from the fair value of the stock purchased. As of December 26, 2020, 2,171,656 shares remained available for issuance.

Note 12—Stock-Based Compensation

Stock-Based Compensation Expense

Certain information regarding our stock-based compensation was as follows (in thousands, except per share amounts):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Weighted average grant date per share fair value of RSUs granted	$ 25.96	$ 15.12	$ 13.79
Total intrinsic value of stock options exercised	4,688	1,814	631
Fair value of RSUs vested	$ 42,597	$ 23,450	$ 17,541

Pre-tax stock-based compensation expense by financial statement line and related tax benefit in the Consolidated Statements of Income are as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Stock-based compensation expense included in:			
Cost of revenues	$ 3,951	$ 4,055	$ 3,525
Research and development	5,824	6,367	5,398
Selling, general and administrative	14,055	12,754	8,904
Total stock-based compensation	$ 23,830	$ 23,176	$ 17,827
Stock-based compensation tax benefit	$ 4,962	$ 911	$ 453

Unrecognized Stock-Based Compensation Expense

Unrecognized stock-based compensation expense at December 26, 2020 consisted of the following (in thousands):

	Unrecognized Expense	Weighted Average Recognition Period (Years)
Restricted stock units	$ 32,122	2.2
Performance restricted stock units	9,075	2.1
Employee stock purchase plan	248	0.1
Total unrecognized stock-based compensation expense	$ 41,445	2.2

Valuation Assumptions

The following assumptions were used in estimating the fair value of PRSUs:

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
PRSUs:			
Dividend yield	— %	— %	— %
Expected volatility	52.01 %	47.34 %	45.61 %
Risk-free interest rate	0.18 %	1.83 %	2.67 %
Expected life (in years)	2.8	3.1	2.9

The following assumptions were used in estimating the fair value of shares under the Employee Stock Purchase Plan:

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Employee Stock Purchase Plan:			
Dividend yield	— %	— %	— %
Expected volatility	30.4% - 74.4%	36.6% - 59.5%	44.9% - 48.9%
Risk-free interest rate	0.10% - 1.54%	2.04% - 2.46%	0.83% - 2.22%
Expected life (in years)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0

Note 13—Income Taxes

Components of Income Before Income Taxes

The components of income before income taxes were as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
United States	$ 72,950	$ 41,115	$ 20,877
Foreign	12,225	9,948	13,050
	$ 85,175	$ 51,063	$ 33,927

Provision for Income Taxes

The components of the provision (benefit) for income taxes are as follows (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Current provision:			
Federal	$ 1,799	$ 179	$ 79
State	1,194	2,302	388
Foreign	4,278	4,202	4,687
	7,271	6,683	5,154
Deferred provision (benefit):			
Federal	1,472	8,128	(72,295)
State	(267)	(1,898)	(2,056)
Foreign	(1,824)	(1,196)	(912)
	(619)	5,034	(75,263)
Total provision (benefit) for income taxes	$ 6,652	$ 11,717	$ (70,109)

Tax Rate Reconciliation

The following is a reconciliation of the difference between income taxes computed by applying the federal statutory rate of 21% and the provision (benefit) from income taxes (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
U.S. statutory federal tax rate	$ 17,887	$ 10,723	$ 7,125
State taxes, net of federal benefit	663	441	778
Stock-based compensation	(4,962)	(911)	(453)
Research and development credits	(6,576)	(6,436)	(3,213)
Foreign taxes at rates different than the U.S.	415	1,454	1,287
Other permanent differences	400	(148)	152
Global intangible low-taxed income	—	1,369	1,828
Foreign Derived Intangible Income	(3,668)	—	—
Change in valuation allowance	1,862	2,567	(75,803)
Other	631	2,658	(1,810)
Total	$ 6,652	$ 11,717	$ (70,109)

Deferred Tax Assets and Liabilities

Deferred tax assets and liabilities are recognized for the future tax consequences of differences between the carrying amounts of assets and liabilities and their respective tax basis using enacted tax rates in effect for the year in which the differences are expected to be reversed.

Significant deferred tax assets and liabilities consisted of the following (in thousands):

	As of	
	December 26, 2020	December 28, 2019
Tax credits	$ 42,927	$ 44,696
Inventory reserve	13,401	12,350
Other reserves and accruals	9,470	5,852
Non-statutory stock options	2,794	2,982
Depreciation and amortization	20,961	27,758
Net operating loss carryforwards	18,421	21,410
Gross deferred tax assets	107,974	115,048
Valuation allowance	(38,466)	(36,604)
Total deferred tax assets	69,508	78,444
Acquired intangibles and fixed assets	(8,395)	(13,997)
Unrealized investment gains	(106)	(106)
Tax on undistributed earnings	(110)	(75)
Total deferred tax liabilities	(8,611)	(14,178)
Net deferred tax assets	$ 60,897	$ 64,266

We are required to evaluate the realizability of our deferred tax assets in both our U.S. and non-U.S. jurisdictions on an ongoing basis to determine whether there is a need for a valuation allowance with respect to such deferred tax assets. From the fourth quarter of fiscal 2009 to the third quarter of fiscal 2018, we maintained a 100% valuation allowance against most of our U.S. deferred tax assets because there was insufficient positive evidence to overcome the existing negative evidence such that it was not more likely than not that the U.S. deferred tax assets were realizable. While we reported U.S. pre-tax income in fiscal 2015 and fiscal 2017, because we reported U.S. pre-tax losses during the previous seven fiscal years, we continued to maintain the 100% valuation allowance through the third quarter of fiscal 2018.

The valuation allowance decreased by $75.8 million in fiscal 2018 as we released the valuation allowance against a significant portion of the U.S. federal deferred tax assets and a portion of the U.S. state deferred tax assets. We determined that the positive evidence overcame any negative evidence and concluded that it was more likely than not that the U.S. deferred tax assets were realizable after considering the reported positive operating performance in the U.S. for two consecutive fiscal years, the reported cumulative three-year U.S. pre-tax profit, and the expected positive operating performance in the U.S. for 2019.

As of December 26, 2020, we maintained a valuation allowance of $38.5 million, primarily related to California deferred tax assets arising from research credits and foreign tax credit carryovers, due to uncertainty about the future realization of these assets.

Tax Credits and Carryforwards

Tax credits and carryforwards available to us at December 26, 2020 consisted of the following (in thousands):

		Amount	Latest Expiration Date
Federal research and development tax credit	$	36,579	2023-2040
Foreign tax credit carryforwards		1,059	2021-2027
California research credits		42,615	Indefinite
State net operating loss carryforwards		247,990	2022-Indefinite
Singapore net operating loss carryforwards		7,046	Indefinite

Undistributed Earnings

As of December 26, 2020, unremitted earnings of foreign subsidiaries was estimated at $34.4 million. We intend to permanently invest $12.0 million of undistributed earnings indefinitely outside of the U.S. To the extent we repatriate the remaining $22.4 million of undistributed foreign earnings to the U.S., we established a deferred tax liability of $0.1 million for foreign withholding taxes. Our estimates are provisional and subject to further analysis.

Unrecognized Tax Benefits

We recognize the benefits of tax return positions if we determine that the positions are “more-likely-than-not” to be sustained by the taxing authority. Interest and penalties accrued on unrecognized tax benefits are recorded as tax expense in the period incurred.

The following table reflects changes in the unrecognized tax benefits (in thousands):

	Fiscal Year Ended					
	December 26, 2020		December 28, 2019		December 29, 2018	
Unrecognized tax benefit, beginning balance	$	28,800	$	25,224	$	18,296
Additions based on tax positions related to the current year		3,072		3,679		1,677
Additions based on tax positions from prior years		702		—		5,332
Reductions for tax positions of prior years		—		(5)		(7)
Reductions due to lapse of the applicable statute of limitations		(77)		(98)		(74)
Unrecognized tax benefit, ending balance	$	32,497	$	28,800	$	25,224
Interest and penalties recognized as a component of Provision (benefit) for income taxes	$	50	$	59	$	71
Interest and penalties accrued at period end		204		212		230

Of the unrecognized tax benefits at December 26, 2020, $15.8 million would impact the effective tax rate if recognized.

The amount of income taxes we pay is subject to ongoing audits by federal, state and foreign tax authorities which might result in proposed assessments. Our estimate for the potential outcome for any uncertain tax issue is judgmental in nature. However, we believe we have adequately provided for any reasonably foreseeable outcome related to those matters. Our future results may include favorable or unfavorable adjustments to our estimated tax liabilities in the period the assessments are made or resolved or when statutes of limitation on potential assessments expire. As of December 26, 2020, changes to our uncertain tax positions in the next 12 months that are reasonably possible are not expected to have a significant impact on our financial position or results of operations.

At December 26, 2020, our tax years 2017 through 2020, 2016 through 2020 and 2015 through 2020, remain open for examination in the federal, state and foreign jurisdictions, respectively. However, to the extent allowed by law, the taxing authorities may have the right to examine prior periods where net operating losses and credits were generated and carried forward, and make adjustments up to the net operating loss and credit carryforward amounts.

Note 14—Employee Benefit Plans

We have an employee savings plan that qualifies as a deferred salary arrangement under Section 401(k) of the Internal Revenue Code. The plan is designed to provide employees with an accumulation of funds for retirement on a tax-deferred basis and provide for annual discretionary employer contributions. The total charge to net income under the 401(k) plan for fiscal 2020, 2019 and 2018 aggregated $2.2 million, $2.1 million and $2.0 million, respectively.

Note 15—Segments and Geographic Information

We operate in two reportable segments consisting of the Probe Cards Segment and the Systems Segment.

Our chief operating decision maker ("CODM") is our Chief Executive Officer, who reviews operating results to make decisions about allocating resources and assessing performance for the entire company.

The following table summarizes the operating results by reportable segment (dollars in thousands):

	Fiscal 2020			
	Probe Cards	Systems	Corporate and Other	Total
Revenues	$ 581,739	$ 111,877	$ —	$ 693,616
Gross profit	$ 263,215	$ 51,835	$ (27,130)	$ 287,920
Gross margin	45.2 %	46.3 %	— %	41.5 %

	Fiscal 2019			
	Probe Cards	Systems	Corporate and Other	Total
Revenues	$ 491,363	$ 98,101	$ —	$ 589,464
Gross profit	$ 211,382	$ 50,927	$ (24,813)	$ 237,496
Gross margin	43.0 %	51.9 %	— %	40.3 %

	Fiscal 2018			
	Probe Cards	Systems	Corporate and Other	Total
Revenues	$ 434,269	$ 95,406	$ —	$ 529,675
Gross profit	$ 187,320	$ 47,074	$ (24,055)	$ 210,339
Gross margin	43.1 %	49.3%	— %	39.7 %

Operating results provide useful information to our management for assessment of our performance and results of operations. Certain components of our operating results are utilized to determine executive compensation along with other measures.

Corporate and Other includes unallocated expenses relating to amortization of intangible assets, share-based compensation expense, acquisition-related costs, including charges related to inventory stepped up to fair value, and other costs, which are not used in evaluating the results of, or in allocating resources to, our reportable segments. Acquisition-related costs include transaction costs and any costs directly related to the acquisition and integration of acquired businesses.

The following table summarizes revenue, by geographic region, as a percentage of total revenues based upon ship-to location:

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
China	25.2 %	18.0 %	14.7 %
Taiwan	21.7	14.7	20.3
United States	18.4	26.3	25.2
South Korea	12.5	19.8	17.2
Europe	9.5	7.0	7.5
Japan	6.3	8.9	9.4
Asia-Pacific [1]	4.8	3.7	4.9
Rest of World	1.6	1.6	0.8
Total Revenues	100.0 %	100.0 %	100.0 %

[1]Asia-Pacific includes all countries in the region except Taiwan, South Korea, China, and Japan, which are disclosed separately.

The following table summarizes revenue by market (in thousands):

	Fiscal Year Ended		
	December 26, 2020	December 28, 2019	December 29, 2018
Foundry & Logic	$ 446,183	$ 318,552	$ 258,459
DRAM	109,734	147,257	135,333
Flash	25,822	25,554	40,477
Systems	111,877	98,101	95,406
Total revenues	$ 693,616	$ 589,464	$ 529,675

The following table summarizes revenue by timing of revenue recognition (in thousands):

	Fiscal Year Ended								
	December 26, 2020			December 28, 2019			December 29, 2018		
	Probe Cards	Systems	Total	Probe Cards	Systems	Total	Probe Cards	Systems	Total
Products transferred at a point in time	$ 579,569	$ 104,858	$ 684,427	$ 488,925	$ 93,837	$ 582,762	$ 432,033	$ 91,514	$ 523,547
Services transferred over time	2,170	7,019	9,189	2,438	4,264	6,702	2,236	3,892	6,128
Total	$ 581,739	$ 111,877	$ 693,616	$ 491,363	$ 98,101	$ 589,464	$ 434,269	$ 95,406	$ 529,675

Long-lived assets, comprised of Operating lease, right-of-use-assets, Property, plant and equipment, net, Goodwill and Intangibles, net, reported based on the location of the asset was as follows (in thousands):

	December 26, 2020	December 28, 2019	December 29, 2018
United States	$ 347,654	$ 287,600	$ 280,405
Europe	51,791	52,309	26,118
Asia-Pacific	7,322	7,064	4,385
Total	$ 406,767	$ 346,973	$ 310,908

Note 16—New Accounting Pronouncements

ASU 2016-13
In June 2016, the Financial Accounting Standard Board ("FASB") issued ASU No. 2016-13, "Measurement of Credit Losses on Financial Instruments (Topic 326)." The provisions of this standard require financial assets measured at amortized cost to be

presented at the net amount expected to be collected. An allowance account would be established to present the net carrying value at the amount expected to be collected. ASU 2016-13 also provides that credit losses relating to available-for-sale debt securities should be recorded through an allowance for credit losses. The guidance was amended through various ASU's subsequent to ASU 2016-13, all of which was effective beginning fiscal 2020. We adopted ASU 2016-13 on a prospective basis on December 29, 2019, the first day of fiscal 2020. The adoption did not have a material effect on our financial position, results of operations or cash flows.

ASU 2018-15

In August 2018, the FASB issued ASU 2018-15, "Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer’s Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract." The new guidance clarifies the accounting for implementation costs in cloud computing arrangements. ASU 2018-15 is effective for fiscal years, including interim periods within those fiscal years, beginning after December 15, 2019. We adopted ASU 2018-15 on a prospective basis on December 29, 2019, the first day of fiscal 2020. The adoption did not have a material effect on our financial position, results of operations or cash flows.

ASU 2019-12

In December 2019, the FASB issued ASU 2019-12, “Income Taxes (Topic 740),” which simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740. The amendments also improve consistent application of and simplify GAAP for other areas of Topic 740 by clarifying and amending existing guidance. This guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. Early adoption of the amendments is permitted, including adoption in any interim period for which financial statements have not yet been issued. Depending on the amendment, adoption may be applied on the retrospective, modified retrospective or prospective basis. We do not expect the adoption of ASU 2019-12 to have a material effect on our financial position, results of operations or cash flows.

ASU 2020-04

In March 2020, the FASB issued ASU 2020-04, "Referenced Rate Reform (Topic 848) - Facilitation of the Effects of Reference Rate Reform on Financial Reporting." The amendments in this update apply only to contracts and hedging relationships that reference LIBOR or another reference rate expected to be discontinued due to reference rate reform. The expedients and exceptions provided by the amendments do not apply to contract modifications made and hedging relationships entered into or evaluated after December 31, 2022. The amendments in this update are elective and are effective upon issuance for all entities. We have not yet evaluated the transition approach for our LIBOR indexed contracts and have not determined whether we will be electing such expedients and exceptions.

Exhibit 4.2

DESCRIPTION OF SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

The following summary describes the common stock, $0.001 par value per share, of FormFactor, Inc. (the “Company,” “we,” “us” and “our”), which is the only class of securities of the Company registered pursuant to Section 12 of the Securities Exchange Act of 1934, as amended.

Description of Common Stock

The following description of our common stock is based upon our amended and restated certificate of incorporation (our “certificate of incorporation”), our amended and restated bylaws (our “bylaws”) and applicable provisions of law. We have summarized certain portions of our certificate of incorporation and bylaws below. The summary is not complete. Our certificate of incorporation and our bylaws have been incorporated by reference as exhibits to the Annual Report on Form 10-K of which this Exhibit 4.2 is a part. You should read our certificate of incorporation and bylaws for the provisions that are important to you.

Certain provisions of the Delaware General Corporation Law, our certificate of incorporation and our bylaws may have an anti-takeover effect. This may delay, defer or prevent a tender offer or takeover attempt that a stockholder might consider in its best interests, including those attempts that might result in a premium over the market price for shares of our common stock.

Authorized Capital Stock

Our authorized capital stock consists of 250,000,000 shares of common stock, $0.001 par value per share, and 10,000,000 shares of undesignated preferred stock, $0.001 par value per share.

Dividend Rights

Subject to preferences that may apply to shares of preferred stock outstanding at the time, the holders of outstanding shares of our common stock are entitled to receive dividends out of assets legally available at the times and in the amounts that our board of directors may determine from time to time.

Voting Rights

Each holder of common stock is entitled to one vote for each share of common stock held on all matters submitted to a vote of stockholders. We have not provided for cumulative voting for the election of directors in our certificate of incorporation. This means that the holders of a majority of the shares voted can elect all of the directors then standing for election. In addition, our certificate of incorporation and bylaws provide that certain actions require the approval of two-thirds, rather than a majority, of the shares entitled to vote. For a description of these actions, see “Anti-Takeover Effects of Delaware Law and our Certificate of Incorporation and Bylaws” below.

No Preemptive, Conversion or Redemption Rights

Our common stock is not entitled to preemptive rights and is not subject to conversion, redemption or sinking fund provisions.

Right to Receive Liquidation Distributions

Upon our liquidation, dissolution or winding-up, the holders of common stock are entitled to share in all assets remaining after payment of all liabilities and the liquidation preferences of any outstanding preferred stock. Each outstanding share of common stock is fully paid and nonassessable.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

Certain provisions of Delaware law and our certificate of incorporation and bylaws may have the effect of delaying, deferring or discouraging another party from acquiring control of us.

Delaware Law

We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder, unless:

- the transaction is approved by the board of directors before the date the interested stockholder attained that status;
- upon consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced; or
- on or after the date the business combination is approved by the board of directors and authorized at a meeting of stockholders by at least two-thirds of the outstanding voting stock that is not owned by the interested stockholder.

Section 203 defines "business combination" to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by any of these entities or persons.

A Delaware corporation may opt out of Section 203 either with an express provision in its original certificate of incorporation or in an amendment to its certificate of incorporation or bylaws approved by its stockholders. We have not opted out of this provision. Section 203 could prohibit or delay mergers or other takeover or change in control attempts and, accordingly, may discourage attempts to acquire us.

Certificate of Incorporation and Bylaws

Our certificate of incorporation and bylaws provide that:

- no action can be taken by stockholders except at an annual or special meeting of the stockholders called in accordance with our bylaws, and stockholders may not act by written consent;
- the approval of holders of two-thirds of the shares entitled to vote at an election of directors is required to adopt, amend or repeal our bylaws or amend or repeal the provisions of our certificate of incorporation regarding the election and removal of directors and the ability of stockholders to take action;

- our board of directors is expressly authorized to make, alter or repeal our bylaws;
- stockholders may not call special meetings of the stockholders or fill vacancies on the board of directors;
- our board of directors is divided into three classes serving staggered three-year terms. This means that only one class of directors will be elected at each annual meeting of stockholders, with the other classes continuing for the remainder of their respective terms;
- our board of directors is authorized to issue preferred stock without stockholder approval;
- directors may only be removed for cause by the holders of two-thirds of the shares entitled to vote at an election of directors; and
- we will indemnify officers and directors against losses that they may incur in investigations and legal proceedings resulting from their services to us, which may include services in connection with takeover defense measures.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

Listing

Our common stock is listed on the NASDAQ Global Market under the trading symbol “FORM.”

EXHIBIT 21.1

LIST OF REGISTRANT'S SUBSIDIARIES

SUBSIDIARY NAME	JURISDICTION OF ORGANIZATION
FormFactor International, Inc.	Delaware, United States
FormFactor, K.K.	Japan
FormFactor Korea, Inc.	South Korea
FormFactor Singapore Pte. Ltd.	Singapore
Microprobe HongKong Limited	Hong Kong
Microprobe Technology (Suzhou) Co. Ltd.	People's Republic of China
FormFactor Beaverton, Inc.	Oregon, United States
FormFactor GmbH	Germany
Cascade Microtech Singapore Pte, Ltd	Singapore
Cascade International (Shanghai) Trading Co., Ltd.	People's Republic of China
Advanced Temperature Test Systems GmbH	Germany
FormFactor SASU	France
FRT GmbH	Germany
High Precision Devices, Inc.	Colorado, United States

EXHIBIT 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors
FormFactor, Inc.:

We consent to the incorporation by reference in the registration statement on Form S3 (No. 333-198760) and Form S-8 (Nos. 333-239388, 333-232990, 333-226432, 333-222551, 333-212587, 333-195744, 333-188363, 333-181450, 333-179589, 333-172318, 333-165058, 333-157610, 333-149411, 333-148198, 333-139074, 333-125918, 333-115137, and 333-106043) of FormFactor, Inc. of our report dated February 22, 2021, with respect to the consolidated balance sheets of FormFactor, Inc. as of December 26, 2020 and December 28, 2019, the related consolidated statements of income, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 26, 2020, and the related notes, and the effectiveness of internal control over financial reporting as of December 26, 2020, which report appears in the December 26, 2020 annual report on Form 10-K of FormFactor, Inc.

Our report refers to a change in the method of accounting for leases in 2019 due to the adoption of new accounting standards.

Our report dated February 22, 2021 on the effectiveness of internal control over financial reporting as of December 26, 2020 contains an explanatory paragraph that states the Company acquired the probe card assets of Advantest Corporation (Baldwin Park) and 100% of the shares of High Precision Devices, Inc. (HPD) during 2020, and management excluded from its assessment of the effectiveness of the Company's internal control over financial reporting as of December 26, 2020, Baldwin Park's and HPD's internal control over financial reporting associated with total assets representing approximately 4% and 3% of consolidated assets as of December 26, 2020, respectively, and total revenues each representing less than 1% of consolidated revenues as of and for the year ended December 26, 2020. Our audit of internal control over financial reporting of the Company also excluded an evaluation of the internal control over financial reporting of Baldwin Park and HPD.

/s/ KPMG LLP
Portland, Oregon
February 22, 2021

EXHIBIT 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 15 U.S.C. SECTION 7241, AS
ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Michael D. Slessor, certify that:

1. I have reviewed the Annual Report on Form 10-K of FormFactor, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date:	February 22, 2021	/s/ MICHAEL D. SLESSOR
		Michael D. Slessor *Chief Executive Officer* *(Principal Executive Officer and Director)*

EXHIBIT 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 15 U.S.C. SECTION 7241,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Shai Shahar, certify that:

1. I have reviewed the Annual Report on Form 10-K of FormFactor, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2021

/s/ SHAI SHAHAR
Shai Shahar
Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

EXHIBIT 32.1

CERTIFICATION OF
CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the annual report on Form 10-K of FormFactor, Inc., a Delaware corporation, for the period ended December 26, 2020, as filed with the Securities and Exchange Commission, each of the undersigned officers of FormFactor, Inc. certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to his respective knowledge:

(1) the annual report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) the information contained in the annual report fairly presents, in all material respects, the financial condition and results of operations of FormFactor, Inc. for the periods presented therein.

Date:	February 22, 2021	/s/ MICHAEL D. SLESSOR Michael D. Slessor *Chief Executive Officer* *(Principal Executive Officer and Director)*
Date:	February 22, 2021	/s/ SHAI SHAHAR Shai Shahar *Chief Financial Officer* *(Principal Financial Officer and Principal Accounting Officer)*