

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 31, 2022

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**  
(State or other jurisdiction of  
incorporation or organization)

**13-3711155**  
(I.R.S. Employer  
Identification No.)

**7005 Southfront Road, Livermore, California**  
(Address of principal executive offices)

**94551**  
(Zip Code)

**(925) 290-4000**

(Registrant's telephone number, including area code)

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

Trading Symbol(s)

Name of each exchange on which registered

Title of each class  
**Common stock, \$0.001 par value**

**FORM**

**Nasdaq Global Market**

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

None

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

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 24, 2022 (the last business day of the registrant's most recently completed second quarter) as reported by Nasdaq Global Market on that date: \$2,239.4 million.

The number of shares of the registrant's common stock, par value \$0.001 per share, outstanding as of February 17, 2023 was 77,140,504 shares.

**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the registrant's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders, which will be filed within 120 days of the end of the registrant's fiscal year ended December 31, 2022, 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 31, 2022  
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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 31, 2022, December 25, 2021 and December 26, 2020.

## 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 margins, liquidity, operating expenses, products, projected costs and capital expenditures, research and development programs, sales and marketing initiatives, competition, and the 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;
- changes in trade, tariff or export regulations in the markets where we produce or sell our products;
- the reduction, rescheduling or cancellation of orders by our customers;
- our ability to collect accounts receivable 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 labor, 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; and
- factors impacting political and global economic stability, including natural disasters, pandemics, 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 essential test and measurement technologies along the full semiconductor product lifecycle - from characterization, modeling, reliability, and design de-bug, to qualification and production test. 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 accelerate profitability by optimizing device performance and advancing yield knowledge.

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”); in October 2020, we acquired High Precision Devices, Inc. (“HPD”), and in June 2022, we acquired the assets of the dilution refrigerator product line of American ULT Cryogenics, formerly d/b/a JanisULT (“Woburn”). These acquisitions have helped transform our business into a semiconductor test and measurement market leader with greater scale, diversification, breadth and market opportunities from lab to fab.

As of December 31, 2022, 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.

#### 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 40 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 on 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 probe 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. Probe systems are a fundamental tool for characterizing and verifying electrical performance and reliability to enable new semiconductor technologies. We design our probe 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, Silicon Carbide (SiC) power, Silicon Photonics, 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 Systems.* Our cryogenic systems include the manufacture of precision cryogenic instruments and semiconductor test and measurement systems. These include advanced cryogenic probe systems to test complete wafers or singulated die, as well as Dilution Refrigerator (DR) and Adiabatic Demagnetization Refrigerator (ADR) cryostats used in various applications at close to absolute zero degree temperature, including quantum and superconducting computing applications, astronomy, 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 and chip 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. Our applications engineers assist our customers in test methodologies to make advanced measurements during process and product development, and during mass production, along with offering traditional maintenance services.

## Customers

Our customers include companies, universities and institutions that design or make semiconductor and semiconductor related products in the foundry & logic, DRAM, flash, display, sensor and quantum computer 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, NOR flash memory, and quantum computer processor devices.

Fabless semiconductor suppliers do not manufacture their own semiconductors, but they purchase our analytical probes, probe stations, and other System segment 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 - Results of Operations - Revenues by Geographic Region* and Note 16 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 represented 10% or more of our quarterly revenues for the quarters indicated:

	Fiscal Quarters Ended							
	Dec. 31, 2022	Sep. 24, 2022	June 25, 2022	Mar. 26, 2022	Dec. 25, 2021	Sep. 25, 2021	June 26, 2021	Mar. 27, 2021
Intel Corporation	16.5 %	17.0 %	20.9 %	20.8 %	16.7 %	20.8 %	16.3 %	28.1 %
SK hynix Inc.	*	10.7	*	*	*	*	*	*
Taiwan Semiconductor Manufacturing Co., LTD.	*	*	*	10.7	*	*	11.0	11.5
Samsung Electronics Co., LTD.	*	*	*	*	13.8	12.9	14.7	*
	<u>16.5 %</u>	<u>27.7 %</u>	<u>20.9 %</u>	<u>31.5 %</u>	<u>30.5 %</u>	<u>33.7 %</u>	<u>42.0 %</u>	<u>39.6 %</u>

\* Less than 10% of revenues.

## Segment and Enterprise-Wide Disclosures

See Note 16 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, and 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 regularly assess and evaluate alternative sources of supply for all components and materials.

Our primary manufacturing facilities are located in Livermore, Carlsbad, and Baldwin Park, California; Beaverton, Oregon; Boulder, Colorado; and Woburn, Massachusetts, all in the United States; and in Thiendorf, Munich, and Bergisch Gladbach, Germany. We also have smaller manufacturing operations in Suzhou, China; and Yokohama, Japan.

We maintain repair and service capabilities in Livermore and Carlsbad, California and Beaverton, Oregon, United States; Thiendorf, Dresden, Munich and Bergisch Gladbach Germany; 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 strong 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.

#### **Governmental Regulations**

We are subject to international, federal, state and local regulations that are customary to businesses in our industry. These regulations relate to, among other things, environmental matters, anti-corruption, marketing, fraud and abuse, trade regulations, employment, and privacy.

#### **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 31, 2022. There are no matters pending that we currently believe are reasonably possible of having a material impact to our business, consolidated financial condition, results of operations or cash flows. 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.

#### **Import and Export Control**

We manufacture, market and sell our products both inside and outside the U.S. Certain products are subject to export control regulations. Failure to comply with these laws could result in sanctions by the U.S. or other respective governments, including substantial monetary penalties, denial of import, export or other privileges, and debarment from government contracts. Approximately 22% of our fiscal 2022 revenue was derived from sales to customers in China, which is subject to the recent

expanded export license requirements imposed by the United States government. We continue to take all necessary steps to ensure full compliance with these new rules, including holding shipments, if necessary.

### **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 Cards.* The probe card market is comprised 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., Chungwa Precision Technology, 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 Co., and TechnoProbe offer probe cards built using similar types of MEMS technology as we do. 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, and include customer service, knowledge of measurement techniques, delivery time, price, probe card lifetime, chip damage prevention, probe tip touch-down accuracy, speed 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 competitors in the analytical probe market are GGB Industries Inc. and MPI Corporation. 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., 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 (a KLA company), 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 to 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 Tempronic 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 Systems.* In the market for cryogenic systems, we compete principally against Bluefors Oy, Entropy, 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 be adversely 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 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 across 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, reflects company performance, and aligns 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 offer a variety of benefits such as health insurance, paid and unpaid leaves, retirement, and 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 increasingly complex business and industry, and are designed to foster skills development, compliance and our company values. In addition to formal training, the capabilities of our workforce are intended to grow through structured feedback, mentorship, team building, career progression, tuition assistance, and a culture of transparency.

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, and 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.

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, and requiring those who may be sick to stay home.

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 31, 2022, we had 2,105 regular full-time employees, including 1,170 in operations, 426 in research and development, 322 in sales and marketing and 187 in general and administrative functions. By region, 1,420 of our employees were in North America, 391 in Asia, and 294 in Europe. As of December 31, 2022, our Probe Cards Segment had 1,485 regular full-time employees, our Systems Segment had 426 regular full-time employees, plus we had 194 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 one of our manufacturing facilities 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.

#### **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 may 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 those 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 customers new products, or an existing product incorporating new technology;
- transition our products to new manufacturing technologies, as necessary;
- 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;
- obtain and maintain intellectual property rights where necessary;
- hire and retain high performing engineering personnel;
- 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 microprocessors, 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 19.0% of total revenues in fiscal 2022, two customers represented a combined 31.8% of total revenues in fiscal 2021 and one customer represented 31.5% of total revenues in fiscal 2020. 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, which can drive material fluctuations in sales volume, gross margins due to changes in mix, and leverage on fixed costs. 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, including but not limited to the potential for impairment of inventories. 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 probe card 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 impacts of epidemics and pandemics, military conflicts, climate change, trade barriers (such as the U.S.-China trade restrictions implemented during fiscal 2022) 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 that use semiconductors, such as servers, personal computers, automobiles and cell phones. 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. For example, in the second half of fiscal 2022, we saw a significant decline in demand for foundry & logic and DRAM products due to cyclicalities in those markets. 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, such as the decline in bookings and revenues in the second half of fiscal 2022. 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 and profitability 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. These delays and other inefficiencies may arise from a variety of factors. Further, these investments may consume available cash in the short term for a presumed future benefit that may or may not occur. These impacts have caused, and could cause in the future, our operating results and liquidity to decline.

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/or have installation issues in the field, due to the complexity of customer requirements. These challenges, if not timely resolved could have a material adverse effect on operating results and our ability to compete effectively.

***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 cyclical nature 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, 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;
- 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, or scarcity of raw materials from 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 global, regional or national health crises or armed conflict. The occurrence of any of these risks could adversely impact our business, results of operations and financial condition.

We are dependent on the availability of certain key raw materials and natural resources used in our products and various manufacturing processes, and we rely on third parties to supply us with these materials in a cost-effective and timely manner. Our access to raw materials may be adversely affected if our suppliers' operations were disrupted as a result of limited or delayed access to key raw materials and natural resources, which may result in increased cost for these items.

***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. Health crises 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 an area 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 electric power infrastructure. We have previously experienced disruptions to electrical power at some of our premises in California and China, 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.

***Climate change, or legal, regulatory or market measures to address climate change, may negatively affect our business and operations.***

The physical impacts of climate change could adversely impact our costs and operations. There has been public discussion that climate change may be associated with rising sea levels as well as extreme weather conditions such as more intense hurricanes, thunderstorms, tornadoes, drought, and snow or ice storms. Extreme weather conditions may increase our costs or cause damage to our facilities, and any damage resulting from extreme weather may not be fully insured, and may also limit our ability to fully insure facilities on a cost-effective basis in the future. Periods of extended inclement weather may inhibit construction of our capital improvement projects. Any such events could adversely impact our costs or results of operations.

Concerns relating to climate change have led to a range of local, state, federal, and international regulatory and policy efforts to seek to address greenhouse gas ("GHG") emissions. In the U.S., various approaches are being proposed or adopted at the federal, state, and local government levels. These efforts could lead to additional costs on the Company now or in the future, including increased energy and other capital or operational costs, or additional legal requirements on the Company. These efforts could also materially increase our costs of evaluating potential manufacturing sites, or in some cases eliminate some potential locations as feasible sites. In addition to the potential for additional GHG regulation or incentives, enhanced corporate, public, and stakeholder awareness of climate change could affect the Company's reputation or customer demand. Climate change concerns and GHG regulatory efforts could also affect the Company's customers themselves. We could also face pressure from these groups to adapt our physical facilities for alternative sources of energy, which may be less cost-effective than current sources. Any of these factors, individually or combined with one or more factors, or other unforeseen factors or other impacts of climate change, could affect the Company and adversely impact our business, operations, or financial condition.

***Global, regional or national health crises, such as the COVID-19 pandemic, have impacted, and could 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, these outbreaks have 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 them. For example, a variety of health orders and regulations arising from the COVID-19 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. The extension of existing government orders and implementation of new orders or mandates, such as government vaccine and testing mandates, could impact the availability of members of our workforce or lead to the loss of key employees, further adversely impacting our business. Implementation of such mandates and requirements could also have similar consequences for our suppliers, which

may impact their ability to deliver their goods and services to us. Even as the availability of vaccines has relieved the economic effects of the COVID-19 pandemic, new variants of the virus may continue to impede the vaccines' efficacy, or other factors may prolong or worsen the pandemic and its direct and indirect effects upon our business.

In response, many of our employees continue to work remotely, which can increase operational risk and cybersecurity risks. If we do not respond appropriately to these health crises, 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. Health crises may heighten the risks posed by our dependence upon sole or limited source suppliers to the extent that they 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 these health crises impact 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 each event; governmental, business and other actions including government vaccine and testing mandates (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 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, and the circumstances which give rise to new or existing infectious diseases becoming epidemics or pandemics with potentially similar impacts to the COVID-19 pandemic are expected to persist.

***Adverse global, regional and national economic conditions could have a negative effect on our business, results of operations, financial condition, liquidity, and access to capital markets.***

A variety of factors, including natural disasters, health crises, climate change, military conflicts and other geopolitical events, may adversely affect national, regional and global economies and financial markets. Any of these events 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. These events may also increase uncertainty in global credit and financial markets. The impacts of such uncertainty and disruptions to the availability of credit or other sources of capital could also adversely affect our ability to access capital on favorable terms or on a timely basis 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.

***Sustained inflation could have a material adverse effect on our business, financial condition, results of operations and liquidity.***

Inflation rates in the markets in which we operate have increased and may continue to rise. Recent inflation has led us to experience higher costs related to labor, materials from suppliers, and transportation. Our suppliers have raised their prices and may continue to raise prices, and in the competitive markets in which we operate, we may not be able to make corresponding price increases to preserve our gross margins and profitability. If inflation rates continue to rise or remain elevated for a sustained period of time, they could have a material adverse effect on our business, financial condition, results of operations and liquidity. We have generally been able to offset increases in these costs through various productivity and cost reduction initiatives, as well as by adjusting our selling prices to pass through some of these higher costs to our customers; however, our ability to raise our selling prices depends on market conditions and competitive dynamics. Given the timing of our actions compared to the timing of these inflationary pressures, there may be periods during which we are unable to fully recover the increases in our costs.

***We rely on the security and integrity of our electronic data systems, managed both internally and by third parties, for our business requirements, and our business can be damaged by 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 attacks. 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.

***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 83%, 84% and 82% for fiscal 2022, 2021 and 2020, 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 2022, 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 certain items which may be subject to Foreign Direct Product Rules (“FDPR”). 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 2022 and 2021 and 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 other key personnel. Competition for qualified resources is intense, and the increased availability of work-from-home arrangements accelerated by the COVID-19 pandemic has intensified and expanded competition. 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.

***We are exposed to additional risks as a result of increased attention by our stakeholders to environmental, social and governance ("ESG") matters.***

Our stakeholders, including customers, investors, advisory firms, employees, and suppliers, among others, are increasing their attention to, and establishing expectations for, ESG and related matters. These expectations can extend to our corporate practices, initiatives, and disclosures, as well as stakeholder standards or preferences for investments or doing business. Third-party agencies have also established or added standards for rating companies on a range of ESG-related factors that may be inconsistent and subject to change. As a result, these expectations may impact the attractiveness of our business, the manner in which we do business, our reputation, the costs of doing business, and the willingness of these stakeholders to engage with, invest in, or retain us. We may be further impacted by the adoption and evolution of ESG-related regulation and legislation in the jurisdictions in which we do business, such as the Securities and Exchange Commission disclosure requirements proposed earlier in 2022, which could result in increased compliance, operational, and other costs.

In addition, the Company has provided voluntary disclosures on ESG matters, including regarding energy usage, greenhouse gas emissions, health and safety, diversity and inclusion, and labor and human rights. Such disclosures are aspirational and based on frameworks and standards for such initiatives and progress that are still developing, assumptions that may change, and disclosure control and procedures that continue to evolve. We may fail, or be perceived to fail, in attaining or maintaining our ESG-related initiatives. The topics on which we focus may not be popular with our stakeholders. These events or perceptions may expose us to additional reputational and operational risks.

#### **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 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. If we fail to maintain effective controls or timely implement 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 2022, our stock price (Nasdaq Global Market close price) ranged from \$18.19 per share to \$46.74 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;
- 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, 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 transition from a classified board of directors to a declassified board of directors, such that, until the annual shareholder meeting in 2024, 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. Also, 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. Adjacent to our campus we own approximately 6 acres of vacant land for future expansion. 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 31, 2022 is set forth below:

Location	Principal Use	Segment	Square Footage	Ownership
Livermore, California, United States	Manufacturing	Probe Cards	90,508	Owned
Livermore, California, United States	Corporate headquarters, sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	All	168,636	Leased
Thiendorf, Germany	Sales, marketing, administration, manufacturing, service and repair, distribution, research and development	Systems	101,291	Leased
Beaverton, Oregon, United States	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	Probe Cards	101,205	Leased
Baldwin Park, California, United States	Manufacturing, distribution, research and development	Probe Cards	44,000	Leased
Boulder, Colorado, United States	Sales, marketing, administration, manufacturing, distribution, research and development	Systems	34,133	Leased
Carlsbad, California, United States	Sales, product design, administration, manufacturing, service and repair, distribution, research and development	Probe Cards	30,876	Leased
Woburn, Massachusetts, United States	Sales, marketing, administration, manufacturing, distribution, research and development	Systems	26,070	Leased
Jubei City, Hsinchu, Taiwan	Sales, administration, product design, field service and repair center	All	25,629	Leased
Singapore	Sales, administration, product design, service, and field service	All	24,413	Leased
Suzhou, China	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	All	22,777	Leased
San Jose, California, United States	Sales, marketing, and distribution	Systems	21,489	Leased
Bundang, South Korea	Sales, administration, product design, field service, and repair center	All	17,161	Leased
Yokohama City, Japan	Sales, marketing, administration, product design, manufacturing, service and repair, distribution, research and development	All	13,309	Leased
Bergisch Gladbach, Germany	Sales, manufacturing, administration, service and repair, distribution, research and development	Systems	12,235	Leased
Munich, Germany	Sales, manufacturing, administration, service and repair, distribution, research and development	Systems	11,981	Leased
Shanghai, China	Sales and service	All	3,348	Leased
Dresden, Germany	Sales and service	All	2,960	Leased
Hiroshima, Japan	Repair center	Probe Cards	1,007	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 31, 2022, 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****Stock Information**

Our common stock is listed on The Nasdaq Global Market under the symbol "FORM." As of February 17, 2023, there were 120 registered holders of record of our common stock, which does not include beneficial owners of stock held in street name (i.e., through a brokerage firm, bank, broker-dealer, trust or other similar organization).

**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.

**Repurchases of Common Stock**

In May 2022, our Board of Directors authorized a program to repurchase up to \$75.0 million of outstanding common stock to offset potential dilution from issuances of our common stock under our employee stock purchase plan and equity incentive plan. This authorization is in addition to the program authorized October 2020 to repurchase up to \$50.0 million of outstanding common stock that was fully utilized through June 2022 and expired October 2022. Under the current stock repurchase program, we may repurchase shares from time to time on the open market. The pace of repurchase activity will depend on levels of cash generation, the Company's current stock price, and other factors. The program may be modified or discontinued at any time. The current share repurchase program will expire May 2024.

The following table provides information as of December 31, 2022 with respect to the shares of common stock repurchased during the fourth quarter of fiscal 2022 pursuant to the foregoing Board authorization.

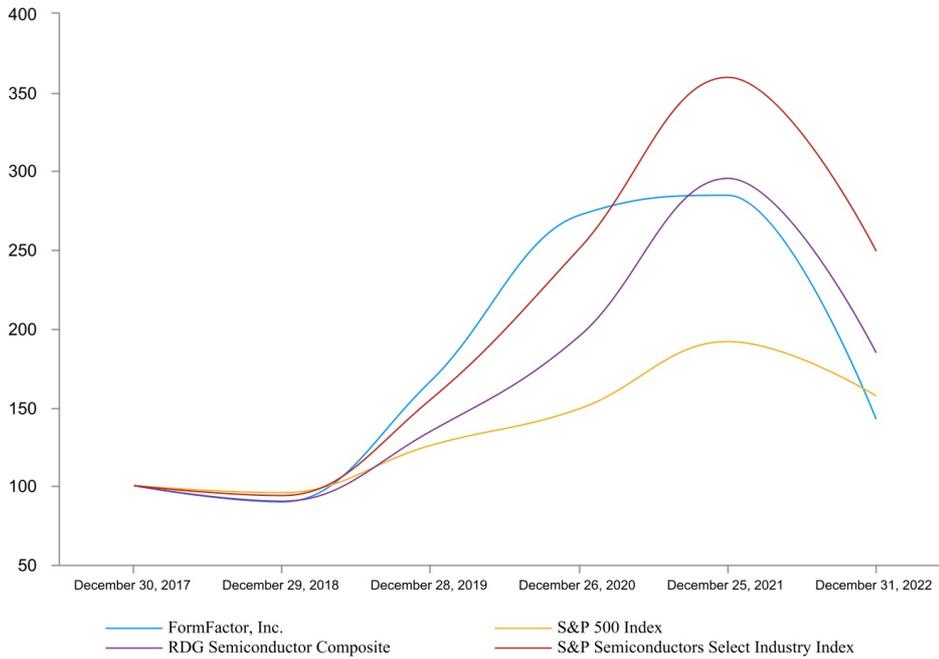
<b>Period (fiscal months)</b>	<b>Total Number of Shares Purchased</b>	<b>Average Price Paid per Share</b>	<b>Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs</b>	<b>Maximum Amount that May Yet Be Purchased Under the Plans or Programs</b>
September 25, 2022 - October 22, 2022	240,479	\$ 25.45	240,479	\$ 21,364,697
October 23, 2022 - November 19, 2022	125,000	21.84	125,000	18,634,446
November 20, 2022 - December 31, 2022	—	—	—	18,634,446
	<u>365,479</u>	<u>\$ 24.22</u>	<u>365,479</u>	

**Stock Price Performance Graph**

The following graph shows the total stockholder return of an investment of \$100 in cash on December 30, 2017 through December 31, 2022 for (1) our common stock, (2) the S&P 500 Index, (3) the RDG Semiconductor Composite (former industry index) and (4) the S&P Semiconductors Select Industry Index (new industry index). We believe the new industry index is more representative of the industry in which we operate and is in alignment with the index utilized by FormFactor within compensation metrics. 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.

**COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN\***

Among FormFactor, Inc., the S&P 500 Index, RDG Semiconductor Composite and the S&P Semiconductors Select Industry Index



\*\$100 invested on December 30, 2017 in stock or index, including reinvestment of dividends.

	Cumulative Total Return					
	December 30, 2017	December 29, 2018	December 28, 2019	December 26, 2020	December 25, 2021	December 31, 2022
FormFactor, Inc.	\$ 100.00	\$ 89.52	\$ 166.39	\$ 272.08	\$ 284.41	\$ 142.04
S&P 500 Index	100.00	95.62	125.72	148.85	191.58	156.89
RDG Semiconductor Composite	100.00	90.09	134.47	195.30	295.15	184.29
S&P Semiconductors Select Industry Index	100.00	93.57	154.61	251.02	359.18	248.88

**Item 6: [Reserved]**

**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 essential test and measurement technologies along the full semiconductor product lifecycle - from characterization, modeling, reliability, and design de-bug, to qualification and production test. 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 accelerate profitability by optimizing device performance and advancing yield knowledge.

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 \$50.7 million in fiscal 2022 compared to net income of \$83.9 million in fiscal 2021 and net income of \$78.5 million in fiscal 2020.

The decrease in net income in fiscal 2022 compared to fiscal 2021 was primarily due to decreased revenues, lower margins driven primarily by a less favorable product mix and lower factory utilization, and increased restructuring charges. This was partially offset by a reduction in the amortization of intangibles and in the annual effective tax rate. The first half of fiscal 2022 was strong, realizing net income of \$60.1 million with \$401.1 million in revenue at 47.0% gross margins. In the second half of fiscal 2022, revenues declined, mainly within the Probe Cards segment, and mix became less favorable, resulting in a net loss of \$9.4 million with \$346.9 million in revenue at 31.0% gross margins. Despite the decline in total revenues in the second half of fiscal 2022, the Systems segment recognized record revenue levels in the third and fourth quarters of fiscal 2022.

The increase in net income in fiscal 2021 compared to fiscal 2020 was primarily due to increased revenue in both of our reportable segments, partially offset by slightly lower margins driven primarily by a less favorable product mix and a higher effective tax rate due to significant one-time tax benefits during fiscal 2020 that did not recur.

## 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 31, 2022, December 25, 2021 and December 26, 2020 included 53 weeks (with 14 weeks in the fourth quarter), 52 weeks and 52 weeks, respectively.

## 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 regularly 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 may 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***

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. An arrangement may include some or all of the following products and services: probe cards, systems, accessories, engineering services, 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 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 over time 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 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 these service contracts recognized over time, we use the input measure of 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 our 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.

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 31, 2022 compared to the year ended December 25, 2021. For a discussion of the year ended December 25, 2021 compared to the year ended December 26, 2020, 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 25, 2021.

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

	Fiscal 2022	Fiscal 2021	Fiscal 2020
Revenues	100.0 %	100.0 %	100.0 %
Cost of revenues	60.4	58.1	58.5
Gross profit	39.6	41.9	41.5
Operating expenses:			
Research and development	14.6	13.1	12.8
Selling, general and administrative	17.6	16.1	16.6
Total operating expenses	32.2	29.2	29.4
Operating income	7.4	12.7	12.1
Interest income	0.3	0.1	0.2
Interest expense	(0.1)	(0.1)	(0.1)
Other income, net	0.2	0.1	0.1
Income before income taxes	7.8	12.8	12.3
Provision for income taxes	1.0	1.9	1.0
Net income	6.8 %	10.9 %	11.3 %

## Revenues by Segment

	Fiscal 2022	Fiscal 2021	Fiscal 2020
	(In thousands)		
Probe Cards	\$ 591,422	\$ 633,281	\$ 581,739
Systems	156,515	136,393	111,877
Total	\$ 747,937	\$ 769,674	\$ 693,616

## Revenues by Market

	Fiscal 2022	% of Revenues	Fiscal 2021	% of Revenues	Change	
	(In thousands, except percentages)					
					\$	%
Probe Cards Markets:						
Foundry & Logic	\$ 409,196	54.7 %	\$ 435,812	56.6 %	\$ (26,616)	(6.1)%
DRAM	133,446	17.8	156,049	20.3	(22,603)	(14.5)
Flash	48,780	6.5	41,420	5.4	7,360	17.8
Systems Market:						
Systems	156,515	21.0	136,393	17.7	20,122	14.8
Total revenues	\$ 747,937	100.0 %	\$ 769,674	100.0 %	\$ (21,737)	(2.8)%

	Fiscal	% of	Fiscal	% of	Change	
	2021	Revenues	2020	Revenues	\$	%
(In thousands, except percentages)						
<b>Probe Cards Markets:</b>						
Foundry & Logic	\$ 435,812	56.6 %	\$ 446,183	64.3 %	\$ (10,371)	(2.3)%
DRAM	156,049	20.3	109,734	15.8	46,315	42.2
Flash	41,420	5.4	25,822	3.7	15,598	60.4
<b>Systems Market:</b>						
Systems	136,393	17.7	111,877	16.2	24,516	21.9
<b>Total revenues</b>	<b>\$ 769,674</b>	<b>100.0 %</b>	<b>\$ 693,616</b>	<b>100.0 %</b>	<b>\$ 76,058</b>	<b>11.0 %</b>

*Foundry & Logic* — The decrease in Foundry & Logic product revenue in fiscal 2022 compared to fiscal 2021 was driven by the weakening demand from the slowdown in the semiconductor industry that began in the third quarter of fiscal 2022 causing decreased unit sales.

*DRAM* — The decrease in DRAM product revenues in fiscal 2022 compared to fiscal 2021 was driven by decreased design wins and customer demand, a result of overall DRAM market weakness in fiscal 2022.

*Flash* — The increase in Flash product revenue in fiscal 2022 compared to fiscal 2021 was driven by increased demand from large multi-national customers.

*Systems* — The increase in Systems product revenue in fiscal 2022 compared to fiscal 2021 was driven by increased sales of probe stations, metrology systems, and cryogenic systems.

#### Revenues by Geographic Region

	Fiscal 2022	% of	Fiscal 2021	% of	Fiscal 2020	% of
		Revenues		Revenues		Revenues
(In thousands, except percentages)						
Taiwan	\$ 169,789	22.7 %	\$ 185,925	24.2 %	\$ 150,837	21.7 %
China	160,668	21.5	163,069	21.2	174,915	25.2
United States	127,730	17.1	122,147	15.9	127,628	18.4
South Korea	111,419	14.9	123,463	16.0	86,951	12.5
Malaysia	50,067	6.7	49,485	6.4	11,382	1.6
Singapore	39,388	5.3	36,197	4.7	16,707	2.4
Europe	39,246	5.2	43,705	5.7	65,572	9.5
Japan	38,419	5.1	36,504	4.7	43,605	6.3
Rest of World	11,211	1.5	9,179	1.2	16,019	2.4
<b>Total Revenues</b>	<b>\$ 747,937</b>	<b>100.0 %</b>	<b>\$ 769,674</b>	<b>100.0 %</b>	<b>\$ 693,616</b>	<b>100.0 %</b>

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 2022 compared to fiscal 2021 were primarily attributable to changes in customer demand and product sales mix.

In October 2022, the United States government imposed new controls, including expanded export license requirements that significantly impacted trade with China for advanced U.S. semiconductor technology sold in China. Although the percentage of revenue to China was relatively stable when comparing fiscal 2022 to fiscal 2021, these restrictions resulted in a decline in expected revenues from shipments to China. Within the Probe Cards segment and Systems segment, respectively, approximately \$7.8 million and \$1.9 million of expected revenues in the fourth quarter of fiscal 2022 were not recognized as a result of these sanctions, and primarily related to China domestic customers. Although the current impact to our large multi-national customers with operations in China has been minimal, it remains to be seen whether these customers will be able to

sustain their licenses going forward. We do not anticipate these expanded export license requirements to be relaxed, and expect these regulatory conditions to continue to negatively affect our revenues similarly going forward.

### **Cost of Revenues and Gross Margins**

Cost of revenues consists primarily of manufacturing materials, compensation and benefits, shipping and handling costs, manufacturing-related overhead (including equipment costs, related occupancy, and computer services), warranty adjustments, inventory adjustments (including write-downs for inventory obsolescence), 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 2022			
	Probe Cards	Systems	Corporate and Other	Total
Gross profit	\$ 235,562	\$ 80,937	\$ (20,490)	\$ 296,009
Gross margin	39.8 %	51.7 %		39.6 %
	Fiscal 2021			
	Probe Cards	Systems	Corporate and Other	Total
Gross profit	\$ 279,873	\$ 65,834	\$ (22,940)	\$ 322,767
Gross margin	44.2 %	48.3 %		41.9 %
	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 %

*Probe Cards*—Gross profit and gross margin in the Probe Cards segment decreased in fiscal 2022 compared to fiscal 2021, primarily due to lower revenues, greater inventory excess and obsolescence reserves, higher net manufacturing spending driven by higher labor and overhead costs, and lower standard margins related to a less favorable product mix.

*Systems*—Gross profit and gross margin in the Systems segment increased in fiscal 2022 compared to fiscal 2021, primarily as a result of higher revenues and a more favorable product mix, largely related to increased sales of 300mm and 200mm probe stations, and metrology systems.

*Corporate and Other*—Corporate and Other includes unallocated expenses relating to amortization of intangible assets, inventory, fixed asset, and deferred revenue 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. The reduction in Corporate and Other in fiscal 2022 compared to fiscal 2021, is primarily due to a reduction in the amortization of intangibles from significant intangibles becoming fully amortized and a reduction in stock-based compensation expense, partially offset by increased restructuring charges arising from a change in estimate of excess and obsolete inventories related to our third quarter of fiscal 2021 plan and the execution of a headcount reduction in the fourth quarter of fiscal 2022 targeted at aligning FormFactor's cost structure with reduced demand levels within the Probe Cards segment by streamlining and improving the efficiency and business effectiveness of our operations.

*Overall*—Gross profit and gross margin fluctuate with revenue levels, product mix, selling prices, factory loading and material costs. For fiscal 2022 compared to fiscal 2021, gross profit and gross margins have decreased on lower revenue levels, a less favorable Probe Cards segment product mix, increased labor, overhead, inventory excess and obsolescence reserves, and restructuring charges, offset by less amortization of intangible assets.

Stock-based compensation expense included in cost of revenues for fiscal 2022 and 2021 was \$3.8 million and \$5.2 million, respectively.

**Research and Development**

	Fiscal Year Ended			
	December 31, 2022	December 25, 2021	\$ Change	% Change
	(Dollars in thousands)			
Research and development	\$ 109,222	\$ 100,937	\$ 8,285	8.2 %
% of revenues	14.6 %	13.1 %		

	Fiscal Year Ended			
	December 25, 2021	December 26, 2020	\$ Change	% Change
	(Dollars in thousands)			
Research and development	\$ 100,937	\$ 89,034	\$ 11,903	13.4 %
% of revenues	13.1 %	12.8 %		

The increase in research and development expenses in fiscal 2022 compared to fiscal 2021 was primarily driven by an increase in headcount which is to support our continued investment in technology leadership. Increased project material costs, general operational costs, annual salary adjustments, restructuring charges, and stock-based compensation also contributed to the increase. These increases were partially offset by lower performance-based compensation. The components of this increase were as follows (in thousands):

	Fiscal 2022 compared to Fiscal 2021
General operational costs	\$ 3,513
Project material costs	3,252
Stock-based compensation	634
Restructuring charges	629
Depreciation	166
Employee compensation costs	91
	<u>\$ 8,285</u>

Stock-based compensation expense included within research and development in fiscal 2022 and 2021 was \$8.2 million and \$7.6 million, respectively.

**Selling, General and Administrative**

	Fiscal Year Ended			
	December 31, 2022	December 25, 2021	\$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	\$ 131,875	\$ 123,792	\$ 8,083	6.5 %
% of revenues	17.6 %	16.1 %		

	Fiscal Year Ended			
	December 25, 2021	December 26, 2020	\$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	\$ 123,792	\$ 115,098	\$ 8,694	7.6 %
% of revenues	16.1 %	16.6 %		

The increase in selling, general and administrative expenses in fiscal 2022 compared to fiscal 2021 was primarily driven by higher stock-based compensation, increased travel related costs as restrictions related to COVID-19 relaxed, restructuring charges, and annual salary increases, partially offset by lower performance-based compensation.

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

	<b>Fiscal 2022 compared to Fiscal 2021</b>
Stock-based compensation	\$ 2,712
General operating expenses	2,672
Travel related costs	2,572
Restructuring charges	2,115
Employee compensation	(1,412)
Consulting fees	(576)
	<u>\$ 8,083</u>

Stock-based compensation expense included within selling, general and administrative in fiscal 2022 and 2021 was \$19.3 million, and \$16.6 million, respectively. The increase of stock-based compensation in fiscal 2022 compared to fiscal 2021 was primarily driven by an increase in total awards outstanding, which has increased in recent years consistent with an overall increase in headcount.

#### **Interest Income and Interest Expense**

Interest income is earned on our cash, cash equivalents, restricted cash and marketable securities. The increase in interest income in fiscal 2022 compared to fiscal 2021 was attributable to an increase in investment yields due to the higher interest rate environment.

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 2022 compared to fiscal 2021 was primarily due to lower outstanding debt balances offset by increased average rates on the outstanding debt.

#### **Other income, net**

Other income, net primarily includes the effects of foreign currency impact and various other gains and losses. The increase in other income, net, in fiscal 2022 compared to fiscal 2021 was attributable to a net increase in foreign exchange gains. Foreign exchange gains for fiscal 2022 were \$1.1 million.

#### **Provision for income taxes**

	<b>Fiscal Year Ended</b>		
	<u>December 31, 2022</u>	<u>December 25, 2021</u>	<u>December 26, 2020</u>
	(Dollars in thousands)		
Provision for income taxes	\$ 7,132	\$ 14,576	\$ 6,652
Effective tax rate	12.3 %	14.8 %	7.8 %

Provision 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. Our effective tax rate may vary from period to period based on changes in estimated taxable income or loss by jurisdiction, changes to the valuation allowance, changes to U.S. federal, state or foreign tax laws, changes in ASC 718 stock-based compensation expense/benefit, future expansion into areas with varying country, state, and local income tax rates, and deductibility of certain costs and expenses by jurisdiction.

We have utilized our previous net operating loss carryforwards allowing us to benefit from the available FDII deduction, resulting in a decrease from the U.S. statutory rate and, combined with higher R&D tax credits, a decrease from fiscal 2021 of our worldwide effective tax rate for the fiscal year ended December 31, 2022.

As of January 1, 2022, the Tax Cuts and Jobs Act of 2017 eliminated the option to deduct research and experimental expenditures immediately in the year incurred and requires taxpayers to amortize such expenditures attributable to domestic and foreign research over five and fifteen years, respectively. While it is possible that Congress may defer, modify, or repeal this provision, potentially with retroactive effect, we have no assurance that this provision will be deferred, modified, or repealed. An Advanced Manufacturing Investment credit becomes available in 2023 and is a 25% credit for qualified investments in an advanced manufacturing facility. We expect to generate federal tax credits under this program that will both lower our effective



### **Investing Activities**

Net cash used in investing activities in fiscal 2022 primarily related to \$65.3 million of cash used in the acquisition of property, plant and equipment, \$6.1 million used for the purchase of marketable securities, net of maturities, and \$3.4 million used for the acquisition of a business.

### **Financing Activities**

Net cash used in financing activities in fiscal 2022 primarily related to \$82.3 million used to purchase common stock under our stock repurchase program, \$15.7 million used to pay tax withholdings for net share settlements of employee equity awards, and \$8.4 million of principal payments made towards the repayment of our term loans, partially offset by \$10.5 million of proceeds received from issuances of common stock under our stock incentive plans.

### **Debt**

#### **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 in fiscal 2019.

The FRT Term Loan bore interest at a rate equal to the Euro Interbank Offered Rate ("EURIBOR") plus 1.75 % per annum and was repaid in quarterly installments of approximately \$2.0 million plus interest. We made the final payment on the FRT Term Loan on October 25, 2022. We are no longer subject to the terms of the FRT Term Loan.

#### **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 31, 2022 was 5.87%.

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 included a 0% floor that was effective for one year from the date of the swap. As of December 31, 2022, the notional amount of the loan that is subject to this interest rate swap is \$15.5 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 Union Bank in writing.

The Building Term Loan contains covenants customary for financing of this type. As of December 31, 2022, the balance outstanding pursuant to the Building Term Loan was \$15.5 million, and we were in compliance with all covenants under the agreement.

#### **Stock Repurchase Programs**

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 compensation programs. This repurchase program replaced the previous repurchase program that expired in February 2020 to purchase up to \$25.0 million of outstanding common stock. There was no stock repurchased in fiscal 2020. During fiscal 2021, we repurchased 622,400 shares of common stock for \$24.0 million, and, as of December 31, 2022 we had utilized the remaining funds available for repurchase under this program after repurchasing 676,408 shares of common stock for \$26.0 million during fiscal 2022.

On May 20, 2022, our Board of Directors authorized an additional program to repurchase up to \$75 million of outstanding common stock, also with the primary purpose of offsetting potential dilution from issuance of common stock under our stock-based compensation programs. This share repurchase program will expire on May 20, 2024. During fiscal 2022, we repurchased 1,700,893 shares of common stock for \$56.4 million, and as of December 31, 2022 \$18.6 million remained available for future repurchases.

## Contractual Obligations and Commitments

The following table summarizes our significant contractual commitments to make future payments in cash under contractual obligations as of December 31, 2022 (in thousands):

	Payments Due In Fiscal Year						2028 and thereafter	Total
	2023	2024	2025	2026	2027			
Operating leases	\$ 8,038	\$ 7,784	\$ 7,695	\$ 6,615	\$ 5,737	\$ 3,423	\$ 39,292	
Term loans - principal payments	1,050	1,080	1,111	1,142	1,175	9,941	15,499	
Term loans - interest payments <sup>(1)</sup>	894	835	763	699	630	2,324	6,145	
Total	\$ 9,982	\$ 9,699	\$ 9,569	\$ 8,456	\$ 7,542	\$ 15,688	\$ 60,936	

<sup>(1)</sup> Represents our minimum interest payment commitments at 5.87% per annum for the Building Term Loan, excluding the interest rate swap described in Debt, above.

The table above excludes our gross liability for unrecognized tax benefits, which totaled \$40.1 million as of December 31, 2022. The timing of any payments which could result from these unrecognized tax benefits will depend upon a number of factors and, accordingly, the timing of payment cannot be estimated.

## 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 damage 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 31, 2022 or December 25, 2021.

## New Accounting Pronouncements

See Note 17, *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, 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 31, 2022. We do not use derivative financial instruments for trading or speculative purposes. We recognized a net gain from foreign exchange of \$1.1 million and zero in fiscal 2022 and 2021, respectively, and a net loss of \$0.5 million in fiscal 2020.

## 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. treasuries, U.S. agency discount notes, money market funds, corporate bonds, 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 Loans (see Note 5, *Debt*, of Notes to Consolidated Financial Statements) is insignificant as a result of the interest-rate swap agreement (see Note 8, *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 31, 2022 and December 25, 2021 would have affected the fair value of our investment portfolio by \$2.1 million and \$1.8 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 as of December 31, 2022 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) that occurred during the fourth quarter of fiscal 2022, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

### 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.

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 31, 2022. 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 31, 2022.

The effectiveness of our internal control over financial reporting as of December 31, 2022 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.

#### **Item 9C: Disclosure Regarding Foreign Jurisdictions that Prevent Inspections**

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 2023 Annual Meeting of Stockholders under the captions Corporate Governance, Executive Officers, and, if applicable, Delinquent Section 16 Reports.

**Item 11: *Executive Compensation***

The information required by this item is incorporated by reference to the proxy statement for our 2023 Annual Meeting of Stockholders under the captions Executive Compensation and Related Information, Compensation Committee Interlocks and Insider Participation and Report of the Compensation Committee.

**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 2023 Annual Meeting of Stockholders under the captions Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters, and Equity Compensation Plans.

**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 2023 Annual Meeting of Stockholders under the captions Certain Relationships and Related Transactions and Independence of Directors.

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

Our independent registered public accounting firm is KPMG, LLP; Portland, Oregon; Auditor Firm ID: 185.

The information required by this item is incorporated by reference to the proxy statement for our 2023 Annual Meeting of Stockholders under the caption Principal Auditor Fees and Services.

## PART IV

### Item 15: Exhibits and 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:

	<u>Page</u>
Report of Independent Registered Public Accounting Firm	<a href="#">44</a>
Consolidated Balance Sheets as of December 31, 2022 and December 25, 2021	<a href="#">46</a>
Consolidated Statements of Income for the fiscal years ended December 31, 2022, December 25, 2021 and December 26, 2020	<a href="#">47</a>
Consolidated Statements of Comprehensive Income for the fiscal years ended December 31, 2022, December 25, 2021 and December 26, 2020	<a href="#">48</a>
Consolidated Statements of Stockholders' Equity for the fiscal years ended December 31, 2022, December 25, 2021 and December 26, 2020	<a href="#">49</a>
Consolidated Statements of Cash Flows for the fiscal years ended December 31, 2022, December 25, 2021 and December 26, 2020	<a href="#">50</a>
Notes to Consolidated Financial Statements	<a href="#">52</a>

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**

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File No	Date of First Filing	Exhibit Number	
<a href="#">3.1</a>	Certificate of Amendment of Amended and Restated Certificate of Incorporation of FormFactor, Inc.	8-K	000-50307	6/3/2022	3.1	
<a href="#">3.2</a>	Restated Certificate of Incorporation of FormFactor, Inc.	8-K	000-50307	6/3/2022	3.2	
<a href="#">3.3</a>	Amended and Restated By-laws of FormFactor, Inc.	8-K	000-50307	6/3/2022	3.3	
<a href="#">4.1</a>	Specimen Common Stock Certificate	S-1/A	333-86738	5/28/2002	4.01	
<a href="#">4.2</a>	Description of Securities	10-K	000-50307	2/22/2021	4.2	
<a href="#">10.3+</a>	Form of Indemnity Agreement	S-1/A	333-86738	5/28/2002	10.01	
<a href="#">10.4+</a>	Form of Change of Control Severance Agreement	8-K	000-50307	7/26/2022	10.1	
<a href="#">10.9+</a>	Employee Incentive Plan, as amended and restated effective October 1, 2019	10-K	000-50307	2/21/2020	10.9	
<a href="#">10.10+</a>	Equity Incentive Plan, as amended and restated effective May 27, 2022	DEF 14A	000-50307	4/13/2022	Appendix B	
<a href="#">10.11+</a>	Employee Stock Purchase Plan, as amended and restated May 18, 2018	DEF 14A	000-50307	4/3/2018	Appendix A	
<a href="#">10.1</a>	First Amendment to FormFactor, Inc. Employee Stock Purchase Plan	10-Q	000-50307	8/2/2022	10.1	
<a href="#">10.12</a>	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	
<a href="#">10.13</a>	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	
<a href="#">10.14</a>	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	
<a href="#">10.15</a>	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	
<a href="#">10.16</a>	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	
<a href="#">10.17+</a>	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	
<a href="#">10.18</a>	Third Amendment, dated December 19, 2016, between FormFactor, Inc. and MOHR PCC, L.P. 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	
<a href="#">10.19+</a>	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	
<a href="#">10.20</a>	Second Amendment, dated December 19, 2016, between FormFactor, Inc. and MOHR PCC, L.P. 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	
<a href="#">10.21</a>	Third Amendment, dated October 1, 2018, between FormFactor, Inc. and MOHR PCC, L.P. 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	
<a href="#">10.22</a>	Fourth Amendment, dated October 1, 2018, between FormFactor, Inc. and MOHR PCC, L.P. 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	
<a href="#">10.27</a>	Rental Agreement by and between Cascade Microtech Dresden GmbH and S✓ss Grundst✓cksverwaltungs GbR dated as of June 17, 2011.	10-Q	000-51072	8/10/2011	10.3	
<a href="#">10.29</a>	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	

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File No	Date of First Filing	Exhibit Number	
<a href="#">10.30</a>	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	
<a href="#">10.31</a>	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	
<a href="#">10.32</a>	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	
<a href="#">10.33</a>	Fifth Amendment to Lease dated September 24, 2014, between Nimbus Center LLC and Cascade Microtech, Inc.	10-K	000-51072	3/7/2016	10.22	
<a href="#">10.34</a>	Sixth Amendment to Lease dated July 8, 2015, between Nimbus Center LLC and Cascade Microtech, Inc.	10-K	000-51072	3/7/2016	10.23	
<a href="#">10.35</a>	Seventh Amendment to Lease dated June 5, 2018, between Nimbus Center LLC and FormFactor Beaverton, Inc.	—	—	—	—	X
<a href="#">10.36</a>	Eighth Amendment to Lease dated December 14, 2022, between Nimbus Center LLC and FormFactor, Inc.	—	—	—	—	X
<a href="#">10.37+</a>	Employment Offer Letter, dated August 29, 2012 to Mike Slessor	10-K	000-50307	3/13/2013	10.19+	
<a href="#">10.38+</a>	CEO Change of Control and Severance Agreement, dated July 20, 2022 by and between Mike Slessor and the Registrant	8-K	000-50307	7/26/2022	10.3	
<a href="#">10.39+</a>	Employment Offer Letter, dated February 15, 2018 to Shai Shahar	10-Q	000-50307	5/8/2018	10.1	
<a href="#">10.40+</a>	Change of Control Severance Agreement, dated July 20, 2022 by and between Shai Shahar and the Registrant	8-K	000-50307	7/26/2022	10.2	
<a href="#">21.1</a>	List of Registrant's subsidiaries	—	—	—	—	X
<a href="#">23.1</a>	Consent of Independent Registered Public Accounting Firm - KPMG LLP	—	—	—	—	X
<a href="#">24.1</a>	Power of Attorney (included on the signature page of this Form 10-K)	—	—	—	—	X
<a href="#">31.1</a>	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
<a href="#">31.2</a>	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
<a href="#">32.1*</a>	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 31, 2022, 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 31, 2022, 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.
- + Indicates a management contract or compensatory plan or arrangement.



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.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
Additional Directors: _____ /s/ THOMAS ST. DENNIS Thomas St. Dennis	Director	February 24, 2023
_____ /s/ RAYMOND LINK Raymond Link	Director	February 24, 2023
_____ /s/ LOTHAR MAIER Lothar Maier	Director	February 24, 2023
_____ /s/ REBECA OBREGON-JIMENEZ Rebeca Obregon-Jimenez	Director	February 24, 2023
_____ /s/ SHERI RHODES Sheri Rhodes	Director	February 24, 2023
_____ /s/ KELLEY STEVEN-WAISS Kelley Steven-Waiss	Director	February 24, 2023
_____ /s/ JORGE TITINGER Jorge Titinger	Director	February 24, 2023
_____ /s/ BRIAN WHITE Brian White	Director	February 24, 2023

## 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 31, 2022 and December 25, 2021, 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 31, 2022, and the related notes (collectively, the consolidated financial statements). We also have audited the Company's internal control over financial reporting as of December 31, 2022, based on 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 31, 2022 and December 25, 2021, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2022, 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 31, 2022 based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

### *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. 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 judgments. 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 \$123.2 million as of December 31, 2022, and inventory write-downs totaled \$24.6 million for the year ended December 31, 2022. 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 certain assumptions used to estimate future consumption of inventory in the Company's model, specifically qualitative other factors that have a high degree of subjectivity and are based on the outcome of uncertain future events.

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 Company's process to estimate inventory excess and obsolescence. This included controls related to the development of certain assumptions used to estimate future consumption of inventory, including qualitative other factors. We assessed the Company's assumptions used to estimate future consumption of inventory, including qualitative other factors by:

- evaluating historical cumulative write down trends and relevant changes to the overall business environment, including key customers and product lines
- evaluating the Company's ability to accurately estimate future consumption by comparing certain assumptions made in prior year to actual results in the subsequent period
- performing inquiries with nonfinancial personnel, including sales and production employees, for a selection of products within inventory for which the Company recorded an adjustment to the cost basis based on qualitative other factors
- selecting a sample of products within inventory for which the Company recorded an adjustment to the cost basis based on qualitative other factors and for each sample selection, we inspected internal and/or external information underlying the qualitative other factors and recalculated 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 24, 2023

**FORMFACTOR, INC.**  
**CONSOLIDATED BALANCE SHEETS**

	<u>December 31, 2022</u>	<u>December 25, 2021</u>
	(In thousands, except share and per share data)	
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 109,130	\$ 151,010
Marketable securities	129,006	125,055
Accounts receivable, net	88,143	115,541
Inventories, net	123,157	111,548
Restricted cash	1,221	2,233
Prepaid expenses and other current assets	23,895	18,652
Total current assets	<u>474,552</u>	<u>524,039</u>
Restricted cash	2,631	2,099
Operating lease, right-of-use-assets	31,362	35,210
Property, plant and equipment, net	189,848	146,555
Goodwill	211,444	212,299
Intangibles, net	26,751	36,342
Deferred tax assets	67,646	61,995
Other assets	3,994	1,981
Total assets	<u>\$ 1,008,228</u>	<u>\$ 1,020,520</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 69,308	\$ 57,862
Accrued liabilities	42,115	50,836
Current portion of term loans, net of unamortized issuance cost of \$5 and \$5	1,045	8,931
Deferred revenue	29,846	23,224
Operating lease liabilities	7,353	7,901
Total current liabilities	<u>149,667</u>	<u>148,754</u>
Term loans, less current portion, net of unamortized issuance cost of \$60 and \$65	14,389	15,434
Deferred tax liabilities	2,732	3,623
Long-term operating lease liabilities	27,587	31,009
Other liabilities	5,568	5,920
Total liabilities	<u>199,943</u>	<u>204,740</u>
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; 76,914,590 and 78,240,506 shares issued and outstanding	77	78
Additional paid-in capital	844,842	898,945
Accumulated other comprehensive loss	(5,578)	(1,449)
Accumulated deficit	(31,056)	(81,794)
Total stockholders' equity	<u>808,285</u>	<u>815,780</u>
Total liabilities and stockholders' equity	<u>\$ 1,008,228</u>	<u>\$ 1,020,520</u>

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

**FORMFACTOR, INC.**  
**CONSOLIDATED STATEMENTS OF INCOME**

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
	(In thousands, except per share data)		
Revenues	\$ 747,937	\$ 769,674	\$ 693,616
Cost of revenues	451,928	446,907	405,696
Gross profit	296,009	322,767	287,920
Operating expenses:			
Research and development	109,222	100,937	89,034
Selling, general and administrative	131,875	123,792	115,098
Total operating expenses	241,097	224,729	204,132
Operating income	54,912	98,038	83,788
Interest income	2,220	569	1,501
Interest expense	(579)	(602)	(864)
Other income, net	1,317	495	750
Income before income taxes	57,870	98,500	85,175
Provision for income taxes	7,132	14,576	6,652
Net income	\$ 50,738	\$ 83,924	\$ 78,523
Net income per share:			
Basic	\$ 0.65	\$ 1.08	\$ 1.02
Diluted	\$ 0.65	\$ 1.06	\$ 0.99
Weighted-average number of shares used in per share calculations:			
Basic	77,578	77,787	76,681
Diluted	78,201	79,133	79,001

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

**FORMFACTOR, INC.**  
**CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME**

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
	(In thousands)		
Net income	\$ 50,738	\$ 83,924	\$ 78,523
Other comprehensive income (loss), net of tax:			
Translation adjustments	(4,864)	(5,995)	5,131
Unrealized gains (losses) on available-for-sale marketable securities	(2,025)	(598)	226
Unrealized gains (losses) on derivative instruments	2,760	(742)	1,188
Other comprehensive income (loss), net of tax	(4,129)	(7,335)	6,545
Comprehensive income	<u>\$ 46,609</u>	<u>\$ 76,589</u>	<u>\$ 85,068</u>

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)					
<b>Balances, December 28, 2019</b>	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
<b>Balances, December 26, 2020</b>	77,437,997	78	903,838	5,886	(165,718)	744,084
Issuance of common stock under the Employee Stock Purchase Plan	378,584	—	9,809	—	—	9,809
Issuance of common stock pursuant to exercise of options for cash	100,000	—	844	—	—	844
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	946,325	1	(20,604)	—	—	(20,603)
Purchase and retirement of common stock	(622,400)	(1)	(24,037)	—	—	(24,038)
Stock-based compensation	—	—	29,095	—	—	29,095
Other comprehensive loss	—	—	—	(7,335)	—	(7,335)
Net income	—	—	—	—	83,924	83,924
<b>Balances, December 25, 2021</b>	78,240,506	78	898,945	(1,449)	(81,794)	815,780
Issuance of common stock under the Employee Stock Purchase Plan	316,861	—	10,457	—	—	10,457
Issuance of common stock pursuant to exercise of options for cash	6,000	—	42	—	—	42
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	728,524	1	(15,706)	—	—	(15,705)
Purchase and retirement of common stock	(2,377,301)	(2)	(82,326)	—	—	(82,328)
Stock-based compensation	—	—	33,430	—	—	33,430
Other comprehensive loss	—	—	—	(4,129)	—	(4,129)
Net income	—	—	—	—	50,738	50,738
<b>Balances, December 31, 2022</b>	76,914,590	\$ 77	\$ 844,842	\$ (5,578)	\$ (31,056)	\$ 808,285

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

**FORMFACTOR, INC.**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
	(In thousands)		
<b>Cash flows from operating activities:</b>			
Net income	\$ 50,738	\$ 83,924	\$ 78,523
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	28,646	25,772	20,694
Amortization	9,391	18,747	27,991
Amortization (accretion) of discount on investments	182	403	(2)
Reduction in the carrying amount of right-of-use assets	8,153	7,172	5,955
Stock-based compensation expense	31,337	29,384	23,830
Deferred income tax provision (benefit)	(6,343)	3,869	(562)
Provision for excess and obsolete inventories	24,632	15,544	13,117
Acquired inventory step-up amortization	476	723	838
Loss on disposal of long-lived assets	296	449	451
Non-cash restructuring charges	200	1,646	—
Gain on contingent consideration	—	(95)	(2,879)
Foreign currency transaction losses (gains)	2,251	1,582	(936)
Loss on derivative instruments	—	—	372
Changes in assets and liabilities:			
Accounts receivable	26,028	(9,086)	(3,545)
Inventories	(28,780)	(31,655)	(22,191)
Prepaid expenses and other current assets	(4,591)	3,808	(6,207)
Other assets	66	(326)	179
Accounts payable	3,899	(6,589)	16,788
Accrued liabilities	(8,002)	(725)	13,892
Other liabilities	(63)	285	362
Deferred revenues	1,286	1,974	8,901
Operating lease liabilities	(8,016)	(7,442)	(6,315)
<b>Net cash provided by operating activities</b>	<b>131,786</b>	<b>139,364</b>	<b>169,256</b>
<b>Cash flows from investing activities:</b>			
Acquisition of property, plant and equipment	(65,254)	(66,496)	(55,865)
Acquisition of business, net of cash acquired	(3,350)	—	(51,880)
Proceeds from sale of subsidiary	—	—	82
Purchase of promissory note receivable	(1,000)	—	—
Purchases of marketable securities	(101,894)	(149,979)	(51,224)
Proceeds from maturities of marketable securities	95,794	91,734	59,965
<b>Net cash used in investing activities</b>	<b>(75,704)</b>	<b>(124,741)</b>	<b>(98,922)</b>
<b>Cash flows from financing activities:</b>			
Proceeds from issuances of common stock	10,499	10,653	10,010
Purchase of common stock through stock repurchase program	(82,328)	(24,038)	—
Tax withholdings related to net share settlements of equity awards	(15,705)	(20,604)	(15,450)
Proceeds from term loan	—	—	18,000
Payments on term loan	(8,398)	(9,337)	(43,417)
Payment of term loan issuance costs	—	—	(78)
Payment of contingent consideration	—	(3,873)	—
<b>Net cash used in financing activities</b>	<b>(95,932)</b>	<b>(47,199)</b>	<b>(30,935)</b>
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(2,510)	(3,180)	3,762
Net increase (decrease) in cash, cash equivalents and restricted cash	(42,360)	(35,756)	43,161
Cash, cash equivalents and restricted cash, beginning of year	155,342	191,098	147,937
Cash, cash equivalents and restricted cash, end of year	<b>\$ 112,982</b>	<b>\$ 155,342</b>	<b>\$ 191,098</b>

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

**FORMFACTOR, INC.**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
(In thousands)			
<b>Supplemental disclosure of non-cash investing and financing activities:</b>			
Operating lease, right-of-use assets obtained in exchange for lease obligations	\$ 4,975	\$ 12,254	\$ 1,912
Increase in accounts payable and accrued liabilities related to property, plant and equipment purchases	7,469	2,711	2,545
<b>Supplemental disclosure of cash flow information:</b>			
Income taxes paid, net	\$ 10,917	\$ 7,957	\$ 9,150
Cash paid for interest, net	535	643	867
Operating cash outflows from operating leases	8,913	8,520	7,546
<b>Reconciliation of cash, cash equivalents and restricted cash:</b>			
Cash and cash equivalents	\$ 109,130	\$ 151,010	\$ 187,225
Restricted cash, current	1,221	2,233	1,904
Restricted cash	2,631	2,099	1,969
<b>Total cash, cash equivalents and restricted cash</b>	<b>\$ 112,982</b>	<b>\$ 155,342</b>	<b>\$ 191,098</b>

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

**FORMFACTOR, INC.**  
**NOTES TO 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 essential test and measurement technologies along the full semiconductor product lifecycle - from characterization, modeling, reliability, and design de-bug, to qualification and production test. 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 accelerate profitability by optimizing device performance and advancing yield knowledge.

Design, development and manufacturing operations are located in Livermore, Carlsbad, and Baldwin Park, California; Beaverton, Oregon; Boulder, Colorado; and Woburn, Massachusetts, all in the United States; Bergisch Gladbach, Munich and Thienendorf, Germany, and sales, service and support operations are located in the United States, Germany, France, Italy, 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 31, 2022, December 25, 2021 and December 26, 2020 consisted of 53 weeks, 52 weeks and 52 weeks, respectively. The first three fiscal quarters in our fiscal year ended December 31, 2022 contained 13 weeks, and the fourth fiscal quarter contained 14 weeks.

**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.

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 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, 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 credit losses, 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, loss contingencies, 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 available-for-sale marketable securities as current assets because they represent investments of cash available for current operations. As a result, the Company recorded all its marketable securities in short-term investments regardless of the contractual maturity date of the securities. Furthermore, we report them at fair value with the related unrealized gains and losses included in Accumulated other comprehensive loss in our Consolidated Balance Sheets. Any unrealized losses which are considered to be other-than-temporary are recorded in Other income, 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, 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 loss in our Consolidated Balance Sheets. We did not record an allowance for credit losses related to our available-for-sale investments during fiscal 2022.

**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, 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 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 Credit Losses**

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 credit losses is maintained based upon our assessment of the expected collectability of all accounts receivable. The allowance for credit losses 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 credit losses was as follows (in thousands):

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
Balance at beginning of year	\$ 195	\$ 248	\$ 222
Charges (reversals) to costs and expenses	(27)	(53)	26
Balance at end of year	<u>\$ 168</u>	<u>\$ 195</u>	<u>\$ 248</u>

**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 regularly 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 may 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 cyclicity 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 \$24.6 million, \$15.5 million and \$13.1 million for fiscal 2022, 2021 and 2020, 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 recorded on a straight-line method. Machinery and equipment, computer equipment and software, and furniture and fixtures are depreciated over 3 to 5 years. Leasehold improvements are amortized over 7 years. Building and building improvements are depreciated over 30 years. 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, if any, 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 use 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 2022, 2021 or 2020.

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 10, *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 10, *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 31, 2022	December 25, 2021	December 26, 2020
Intel Corporation	19.0 %	20.4 %	31.5 %
Samsung Electronics Co., LTD.	*	11.4	*

\* Less than 10% of revenues.

At December 31, 2022, one customer accounted for 13.8% of gross accounts receivable. At December 25, 2021, one customer accounted for 13.8% of gross accounts receivable. 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, engineering services, 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 over time 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 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 these service contracts recognized over time, we use the input measure of 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 our 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 31, 2022, we had \$7.5 million of remaining performance obligations, which were comprised of deferred service contracts, extended warranty contracts, and contracts with over time revenue recognition that are not yet delivered. We expect to recognize approximately 85.7% of our remaining performance obligations as revenue in fiscal 2023, approximately 9.6% in fiscal 2024, and approximately 4.7% in fiscal 2025 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 credit losses. 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 31, 2022 and December 25, 2021 were \$1.9 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 \$30.9 million and \$24.2 million at December 31, 2022 and December 25, 2021, respectively. During fiscal 2022, we recognized \$20.1 million of revenue that was included in contract liabilities as of December 25, 2021.

**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 16, *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 31, 2022	December 25, 2021	December 26, 2020
Balance at beginning of year	\$ 2,805	\$ 3,918	\$ 1,942
Accruals	7,746	5,759	5,727
Settlements	(6,352)	(6,872)	(3,751)
Balance at end of year	<u>\$ 4,199</u>	<u>\$ 2,805</u>	<u>\$ 3,918</u>

**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, 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 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 (“PRSUs”) is based on certain market performance criteria and is measured using a Monte Carlo simulation pricing model.

See Note 12, *Stockholders' Equity*, and Note 13, *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 31, 2022	December 25, 2021	December 26, 2020
Weighted-average shares used in computing basic net income per share	77,578	77,787	76,681
Add potentially dilutive securities	623	1,346	2,320
Weighted-average shares used in computing basic and diluted net income per share	<u>78,201</u>	<u>79,133</u>	<u>79,001</u>

**Accumulated other comprehensive loss**

Accumulated other comprehensive loss (“OCI/L”) 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 31, 2022	December 25, 2021
Unrealized losses on available-for-sale marketable securities and other investments	\$ (2,749)	\$ (724)
Translation adjustments	(5,675)	(811)
Unrealized gains on derivative instruments	2,846	86
Accumulated other comprehensive loss	<u>\$ (5,578)</u>	<u>\$ (1,449)</u>

**Note 3—Balance Sheet Components**

**Marketable Securities**

Marketable securities consisted of the following (in thousands):

<b>December 31, 2022</b>	<b>Amortized Cost</b>	<b>Gross Unrealized Gains</b>	<b>Gross Unrealized Losses</b>	<b>Fair Value</b>
U.S. treasuries	\$ 25,498	\$ —	\$ (479)	\$ 25,019
Commercial paper	24,893	—	(53)	24,840
Corporate bonds	68,845	—	(1,449)	67,396
Certificate of deposit	720	—	(14)	706
U.S. agency securities	11,295	—	(250)	11,045
	<u>\$ 131,251</u>	<u>\$ —</u>	<u>\$ (2,245)</u>	<u>\$ 129,006</u>

<b>December 25, 2021</b>	<b>Amortized Cost</b>	<b>Gross Unrealized Gains</b>	<b>Gross Unrealized Losses</b>	<b>Fair Value</b>
U.S. treasuries	\$ 39,128	\$ —	\$ (143)	\$ 38,985
Commercial paper	32,174	—	(13)	32,161
Corporate bonds	52,832	29	(151)	52,710
Certificate of deposit	1,200	1	(2)	1,199
	<u>\$ 125,334</u>	<u>\$ 30</u>	<u>\$ (309)</u>	<u>\$ 125,055</u>

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 2022 and 2021 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.

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

	<b>December 31, 2022</b>		<b>December 25, 2021</b>	
	<b>Amortized Cost</b>	<b>Fair Value</b>	<b>Amortized Cost</b>	<b>Fair Value</b>
Due in one year or less	\$ 77,663	\$ 76,902	\$ 75,804	\$ 75,778
Due after one year to five years	53,588	52,104	49,530	49,277
	<u>\$ 131,251</u>	<u>\$ 129,006</u>	<u>\$ 125,334</u>	<u>\$ 125,055</u>

See also Note 9, *Fair Value*.

**Inventories, net**

Inventories consisted of the following (in thousands):

	<b>December 31, 2022</b>	<b>December 25, 2021</b>
Raw materials	\$ 55,726	\$ 57,673
Work-in-progress	46,067	35,935
Finished goods	21,364	17,940
	<u>\$ 123,157</u>	<u>\$ 111,548</u>

**Property, Plant and Equipment, net**

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

	December 31, 2022	December 25, 2021
Land	\$ 17,136	\$ 4,751
Building and building improvements	44,932	41,722
Machinery and equipment	276,180	252,632
Computer equipment and software	45,813	44,667
Furniture and fixtures	7,540	7,293
Leasehold improvements	86,500	82,266
Sub-total	478,101	433,331
Less: Accumulated depreciation and amortization	(335,711)	(312,700)
Net property, plant and equipment	142,390	120,631
Construction-in-progress	47,458	25,924
Total	<u>\$ 189,848</u>	<u>\$ 146,555</u>

**Accrued Liabilities**

Accrued liabilities consisted of the following (in thousands):

	December 31, 2022	December 25, 2021
Accrued compensation and benefits	\$ 15,864	\$ 29,706
Accrued income and other taxes	12,817	8,086
Accrued employee stock purchase plan contributions withheld	4,585	4,693
Accrued warranty	4,199	2,805
Accrued restructuring charges	1,249	2,478
Other accrued expenses	3,401	3,068
	<u>\$ 42,115</u>	<u>\$ 50,836</u>

**Note 4—Acquisitions**

**Woburn Acquisition**

On June 9, 2022 we acquired the assets of the dilution refrigerator product line of American ULT Cryogenics, formerly d/b/a JanisULT (“Woburn”), for total consideration of \$3.4 million. This acquisition adds cryogen-free dilution refrigerators capable of cooling to sub-10 millikelvin to our product portfolio, which is required for operation of superconducting quantum computers.

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. Goodwill represents the excess of purchase price over the fair value assigned to the assets acquired and liabilities assumed and is allocated to the HPD reporting unit within the Systems reportable segment. The identified intangible asset, developed technology, has a useful life of three years.

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The fair value of assets acquired, including goodwill and intangibles, and liabilities assumed for the purchase are as follows (in thousands):

	<b>Amount</b>
Accounts receivable	178
Inventories	7,041
Property, plant and equipment	479
Prepaid expenses and other assets	117
Other asset	28
Tangible assets acquired	7,843
Deferred revenue	(5,513)
Accounts payable and accrued liabilities	(30)
<b>Total net tangible assets acquired and liabilities assumed</b>	<b>2,300</b>
Intangible assets	500
Goodwill	550
<b>Net assets acquired</b>	<b>\$ 3,350</b>

**High Precision Devises, Inc. (“HPD”) 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 adjustment for changes in working capital. This acquisition brought 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 in fiscal 2020 related to HPD subsequent to the acquisition date that was included in our Consolidated Statements of Income 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 acquisition date. We subsequently made certain immaterial adjustments within the measurement period to the acquisition price allocation as a result of finalization of our valuation of

**FORMFACTOR, INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)**

identifiable assets and liabilities. The purchase price allocated to the underlying assets acquired, including goodwill and intangibles, and liabilities assumed based on the final amounts are as follows (in thousands):

	<b>Amount</b>
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	916
Tangible assets acquired	9,883
Deferred revenue	(2,529)
Accounts payable and accrued liabilities	(1,268)
Operating lease liabilities	(2,554)
Deferred tax liability	(2,400)
Total net tangible assets acquired and liabilities assumed	1,132
Intangible assets	11,520
Goodwill	5,908
Net assets acquired	<u>\$ 18,560</u>

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

	<b>Amount</b>	<b>Weighted Average Useful Life (in years)</b>
Developed technologies	\$ 7,500	10.0
Customer relationships	3,600	5.0
Order backlog	200	0.5
Trade names	220	5.0
Total intangible assets	<u>\$ 11,520</u>	8.2

The 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 technologies acquired primarily consist 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 technologies 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 customer 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 brought 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 in fiscal 2020 related to Baldwin Park subsequent to the acquisition date that was included in our Consolidated Statements of Income 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 acquisition date. We subsequently made certain immaterial adjustments within the measurement period to the acquisition price allocation as a result of finalization of our valuation of identifiable assets and liabilities. The purchase price allocated to the underlying assets acquired, including goodwill and intangibles, and liabilities assumed based on the final amounts are as follows (in thousands):

	<b>Amount</b>
Accounts receivable	\$ 4,365
Inventory	2,727
Property, plant and equipment	9,053
Operating lease, right-of-use-assets	519
Prepaid expenses and other assets	56
Tangible assets acquired	16,720
Accounts payable and accrued liabilities	(743)
Operating lease liabilities	(519)
Total net tangible assets acquired and liabilities assumed	15,458
Intangible assets	13,600
Goodwill	5,942
Net assets acquired	\$ 35,000

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

	Amount	Weighted Average Useful Life (in years)
Developed technologies	\$ 8,800	10.0
Customer relationships	4,400	3.0
In-process research and development	400	N/A
Total intangible assets	<u>\$ 13,600</u>	7.7

The 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 technologies 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 ("IPR&D") 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 their useful lives. 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 customer 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.

**Note 5—Debt**

Our debt consisted of the following (in thousands):

	December 31, 2022	December 25, 2021
Term loans	\$ 15,499	\$ 24,435
Less unamortized issuance costs	(65)	(70)
Term loans less issuance costs	<u>\$ 15,434</u>	<u>\$ 24,365</u>

**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 bore interest at a rate equal to the Euro Interbank Offered Rate (“EURIBOR”) plus 1.75 % per annum and was repaid in quarterly installments of approximately \$2.0 million plus interest. We made the final payment on the FRT Term Loan on October 25, 2022. We are no longer subject to the terms of the FRT Term Loan.

**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 31, 2022 was 5.87%.

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 included a 0% floor that was effective for one year from the date of the swap. As of December 31, 2022, the notional amount of the loan that is subject to this interest rate swap is \$15.5 million. See Note 9, *Fair Value*, 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 Union Bank in writing.

The Building Term Loan contains covenants customary for financing of this type. As of December 31, 2022, the balance outstanding pursuant to the Building Term Loan was \$15.5 million.

Future principal and interest payments on our term loans as of December 31, 2022, based on the interest rate in effect at that date were as follows (in thousands):

	Payments Due In Fiscal Year						Total
	2023	2024	2025	2026	2027	2028 and thereafter	
Term loans - principal payments	\$ 1,050	\$ 1,080	\$ 1,111	\$ 1,142	\$ 1,175	\$ 9,941	\$ 15,499
Term loans - interest payments <sup>(1)</sup>	894	835	763	699	630	2,324	6,145
	<u>\$ 1,944</u>	<u>\$ 1,915</u>	<u>\$ 1,874</u>	<u>\$ 1,841</u>	<u>\$ 1,805</u>	<u>\$ 12,265</u>	<u>\$ 21,644</u>

<sup>(1)</sup> Represents our minimum interest payment commitment at 5.87% per annum for the Building Term Loan, excluding the interest rate swap described above.

**Note 6—Leases**

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 6 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 5.1 years at December 31, 2022 and the weighted-average discount rate was 3.84%.

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

	Lease Expense		
	December 31, 2022	December 25, 2021	December 26, 2020
Operating lease expense	\$ 8,595	\$ 8,485	\$ 7,468
Short-term lease expense	385	180	136
Variable lease expense	2,393	1,842	1,574
	<u>\$ 11,373</u>	<u>\$ 10,507</u>	<u>\$ 9,178</u>

Future minimum payments under our non-cancelable operating leases were as follows as of December 31, 2022 (in thousands):

Fiscal Year	Amount
2023	\$ 8,038
2024	7,784
2025	7,695
2026	6,615
2027	5,737
Thereafter	3,423
Total minimum lease payments	<u>39,292</u>
Less: interest	<u>(4,352)</u>
Present value of net minimum lease payments	34,940
Less: current portion	<u>(7,353)</u>
Total long-term operating lease liabilities	<u>\$ 27,587</u>

**Note 7—Restructuring Charges**

**2022 Restructuring Plan**

On October 25, 2022, we adopted a restructuring plan (“2022 restructuring plan”) to align our cost structure with reduced demand levels, by streamlining and improving the efficiency and business effectiveness of our operations. This plan has included lowering headcount by approximately 13% of our workforce, which has resulted in recognizing restructuring charges of approximately \$7.0 million for the year ended December 31, 2022, consisting of severance and employee-related costs with \$6.0 million within the Probe Cards segment, \$0.5 million within the Systems segment, and \$0.5 million within Corporate. We expect total restructuring charges of \$8.5 million to \$9.5 million.

**2021 Restructuring Plan**

On September 25, 2021, we adopted restructuring plans (“2021 Restructuring Plans”) to improve our business effectiveness and streamline our operations by consolidating certain manufacturing facilities for both the Probe Cards segment and the Systems segment. This included plans to consolidate or relocate certain leased locations in the United States to other locations in the United States, Germany and Asia. As a result of these changes to certain work locations, we have incurred personnel related costs to sever, relocate, or retain select employees. Additionally, as part of these plans we have undertaken actions to adjust capacity for certain product offerings, which included contract termination costs to satisfy contract obligations. Restructuring charges for the year ended December 31, 2022 were \$8.5 million, consisting of \$0.3 million of severance and employee-related costs, \$0.4 million in contract and lease termination costs, \$7.6 million in inventory impairments and other inventory related costs, and \$0.2 million of cost related to impairment of leasehold improvements, facility exits and fixed asset related costs.

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**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)**

Total restructuring charges for the plans are \$12.6 million, with \$9.9 million within the Probe Cards segment and \$2.7 million within the Systems segment, and were comprised of \$1.3 million of severance and employee-related costs, \$1.8 million in contract and lease termination costs, \$9.0 million in inventory impairments and other inventory related costs, and \$0.5 million of cost related to impairment of leasehold improvements, facility exits and other costs. We do not expect to incur additional material costs related to the 2021 Restructuring Plans.

Total restructuring charges included in our Consolidated Statements of Income for both the 2022 and 2021 Restructuring Plans were as follows (in thousands):

	Fiscal Year Ended	
	December 31, 2022	December 25, 2021
Cost of revenues	\$ 11,775	\$ 3,205
Research and development	1,498	869
Selling, general and administrative	2,166	50
	<u>\$ 15,439</u>	<u>\$ 4,124</u>

Changes to the restructuring accrual during the years ended December 25, 2021 and December 31, 2022 were as follows (in thousands):

	Employee Severance and Benefits	Inventory Impairments & Other Inventory Related Costs	Property and Equipment Impairments & Other Asset Related Costs	Contract Termination & Other Costs	Total
<b>December 26, 2020</b>	\$ —	\$ —	\$ —	\$ —	\$ —
Restructuring charges	1,175	1,376	270	2,800	5,621
Adjustment to restructuring charges	(147)	—	—	(1,350)	(1,497)
Non-cash settlement	—	(1,376)	(270)	—	(1,646)
<b>December 25, 2021</b>	1,028	—	—	1,450	2,478
Restructuring charges	7,269	7,629	186	502	15,586
Cash payments	(7,048)	(1,112)	(112)	(1,719)	(9,991)
Adjustment to restructuring charges	—	—	—	(147)	(147)
Non-cash settlement	—	(6,517)	(74)	(86)	(6,677)
<b>December 31, 2022</b>	<u>\$ 1,249</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 1,249</u>

**Note 8—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, 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 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 31, 2022, we expect to reclassify \$0.5 million of the amount accumulated in other comprehensive loss to earnings during the next 12 months, due to the recognition in earnings of the hedged forecasted transactions.

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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 31, 2022 will mature by the fourth quarter of fiscal 2023.

The following table provides information about our foreign currency forward contracts outstanding as of December 31, 2022 (in thousands):

Currency	Contract Position	Contract Amount (Local Currency)	Contract Amount (U.S. Dollars)
Euro	Buy	21,576	\$ 22,615
Euro	Sell	4,927	5,107
Japanese Yen	Sell	2,989,654	22,906
Korean Won	Buy	2,067,724	1,639
Taiwan Dollar	Sell	42,826	1,397

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):

Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized on Derivatives	Fiscal Year Ended		
		December 31, 2022	December 25, 2021	December 26, 2020
Foreign exchange forward contracts	Other income, net	\$ 2,439	\$ 1,585	\$ (1,437)

The location and amount of gains (losses) related to foreign currency 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/L on Derivative	Location of Gain or (Loss) Reclassified from Accumulated OCI/L into Income	Amount of Gain or (Loss) Reclassified from Accumulated OCI/L into Income
<b>Fiscal 2022</b>	<u>\$ (1,688)</u>	Cost of revenues	\$ (1,816)
		Research and development	(376)
		Selling, general and administrative	(456)
			<u>\$ (2,648)</u>
<b>Fiscal 2021</b>	<u>\$ (1,096)</u>	Cost of revenues	\$ 184
		Research and development	3
		Selling, general and administrative	64
			<u>\$ 251</u>
<b>Fiscal 2020</b>	<u>\$ 1,142</u>	Cost of revenues	\$ 89
		Research and development	77
		Selling, general and administrative	25
			<u>\$ 191</u>

**Interest Rate Swaps**

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 included a 0% floor that was effective for one year from the date of the swap. As of December 31, 2022, the notional amount of the loan that is subject to this interest rate swap was \$15.5 million. See Note 5, *Debt*, for additional information.

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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 are determined at the end of each reporting period based on valuation models that use interest rate yield curves as inputs. 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 Prepaid expenses and other current assets 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/L on Derivative (Effective Portion)	Location of Gain or (Loss) Reclassified from Accumulated OCI/L into Income (Effective Portion)	Amount of Gain or (Loss) Reclassified from Accumulated OCI/L into Income (Effective Portion)
<b>Fiscal 2022</b>	\$ 1,906	Other income, net	\$ 106
<b>Fiscal 2021</b>	451	Other income, net	(154)
<b>Fiscal 2020</b>	(119)	Other income, net	(64)

See also Note 9, *Fair Value*.

**Note 9—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 2022, 2021 or 2020.

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

No changes were made to our valuation techniques during fiscal 2022.

**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.

**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 31, 2022	Level 1	Level 2	Level 3	Total
<b>Assets:</b>				
Cash equivalents:				
Money market funds	\$ 21,279	\$ —	\$ —	\$ 21,279
Commercial paper	—	4,969	—	4,969
U.S. agency securities	—	996	—	996
	<u>21,279</u>	<u>5,965</u>	<u>—</u>	<u>27,244</u>
Marketable securities:				
U.S. treasuries	25,019	—	—	25,019
Certificates of deposit	—	706	—	706
U.S. agency securities	—	11,045	—	11,045
Corporate bonds	—	67,396	—	67,396
Commercial paper	—	24,840	—	24,840
	<u>25,019</u>	<u>103,987</u>	<u>—</u>	<u>129,006</u>
Foreign exchange derivative contracts	—	664	—	664
Promissory note receivable	—	—	943	943
Interest rate swap derivative contracts	—	2,374	—	2,374
<b>Total assets</b>	<b>\$ 46,298</b>	<b>\$ 112,990</b>	<b>\$ 943</b>	<b>\$ 160,231</b>
<b>Liabilities:</b>				
Foreign exchange derivative contracts	\$ —	\$ (193)	\$ —	\$ (193)
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ (193)</b>	<b>\$ —</b>	<b>\$ (193)</b>
<b>December 25, 2021</b>				
<b>Assets:</b>				
Cash equivalents:				
Money market funds	\$ 9,526	\$ —	\$ —	\$ 9,526
U.S. treasuries	2,500	—	—	2,500
Commercial paper	—	1,000	—	1,000
U.S. agency securities	—	5,556	—	5,556
	<u>12,026</u>	<u>6,556</u>	<u>—</u>	<u>18,582</u>
Marketable securities:				
U.S. treasuries	38,985	—	—	38,985
Certificates of deposit	—	1,199	—	1,199
Corporate bonds	—	52,709	—	52,709
Commercial paper	—	32,162	—	32,162
	<u>38,985</u>	<u>86,070</u>	<u>—</u>	<u>125,055</u>
Interest rate swap derivative contracts	—	629	—	629
<b>Total assets</b>	<b>\$ 51,011</b>	<b>\$ 93,255</b>	<b>\$ —</b>	<b>\$ 144,266</b>
<b>Liabilities:</b>				
Foreign exchange derivative contracts	\$ —	\$ (489)	\$ —	\$ (489)
Interest rate swap derivative contracts	—	(55)	—	(55)
<b>Total liabilities</b>	<b>\$ —</b>	<b>\$ (544)</b>	<b>\$ —</b>	<b>\$ (544)</b>

**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* and Note 7, *Restructuring Charges*, there were no assets or liabilities measured at fair value on a non-recurring basis during fiscal 2022, 2021 or 2020.

**Note 10—Goodwill and Intangible Assets**

**Goodwill**

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

	Probe Cards	Systems	Total
<b>Goodwill, as of December 26, 2020</b>	\$ 178,072	\$ 34,689	\$ 212,761
Addition - Baldwin Park acquisition	352	—	352
Addition - HPD acquisition	—	1,254	1,254
Foreign currency translation	—	(2,068)	(2,068)
<b>Goodwill, as of December 25, 2021</b>	178,424	33,875	212,299
Addition - Woburn acquisition	—	550	550
Foreign currency translation	—	(1,405)	(1,405)
<b>Goodwill, as of December 31, 2022</b>	\$ 178,424	\$ 33,020	\$ 211,444

**Intangible Assets**

Intangible assets were as follows (in thousands):

Other Intangible Assets	December 31, 2022			December 25, 2021		
	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Existing developed technologies	\$ 171,441	\$ 151,212	\$ 20,229	\$ 172,259	\$ 148,784	\$ 23,475
Trade name	7,972	7,759	213	8,054	7,603	451
Customer relationships	50,912	45,003	5,909	51,270	39,254	12,016
Backlog	—	—	—	1,896	1,896	—
In-process research and development	400	—	400	400	—	400
	\$ 230,725	\$ 203,974	\$ 26,751	\$ 233,879	\$ 197,537	\$ 36,342

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
Cost of revenues	\$ 3,225	\$ 12,269	\$ 21,609
Selling, general and administrative	6,166	6,478	6,382
	\$ 9,391	\$ 18,747	\$ 27,991

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

Fiscal Year	Amount
2023	\$ 7,166
2024	4,584
2025	4,243
2026	3,155
2027	2,816
Thereafter	4,387
<b>Total</b>	<b>\$ 26,351</b>

We did not record any impairment of intangible assets in fiscal 2022, 2021 and 2020.

**Note 11—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 as of December 31, 2022. There are no matters pending that we currently believe are reasonably possible of having a material impact to our business, consolidated financial condition, results of operations or cash flows. 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 damage 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 31, 2022 or December 25, 2021.

**Legal Matters**

From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. As of December 31, 2022, 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 12—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 dividend 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 31, 2022.

**Common Stock Repurchase Programs**

On October 26, 2020, our Board of Directors authorized a two-year program to repurchase up to \$50 million of outstanding common stock to offset potential dilution from issuances of common stock under our stock-based compensation programs. During fiscal 2020, we did not repurchase any shares. During fiscal 2021 we repurchased and retired 622,400 shares of common stock for \$24.0 million, and as of December 31, 2022 we had utilized the remaining funds available for repurchase under this program after repurchasing 676,408 shares of common stock for \$26.0 million during fiscal 2022.

On May 20, 2022, our Board of Directors authorized an additional program to repurchase up to \$75 million of outstanding common stock, also with the primary purpose of offsetting potential dilution from issuance of common stock under our stock-based compensation programs. This share repurchase program will expire on May 20, 2024. During fiscal 2022, we repurchased and retired 1,700,893 shares of common stock for \$56.4 million and as of December 31, 2022 \$18.6 million remained available for future repurchases.

**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 27.4 million shares, 6.5 million of which were available for grant as of December 31, 2022.

Restricted stock units (“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. 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 25, 2021	2,166,934	\$ 28.63
Granted	1,356,948	34.83
Vested	(1,156,130)	22.60
Canceled	(140,671)	32.73
Restricted stock units at December 31, 2022	<u>2,227,081</u>	<u>35.28</u>

The PRSUs granted in fiscal 2022, 2021 and 2020 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 273,000 PRSUs granted in fiscal 2019, 36,000 shares were forfeited, resulting in 237,000 shares vesting in fiscal 2022. These shares achieved 147% TSR performance, which resulted in an additional 110,605 shares issued during fiscal 2022 related to the 2019 PRSU grant.

PRSU grant activity was as follows:

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
Grant Date	August 1, 2022	August 2, 2021	August 27, 2020
Performance period	July 1, 2022 - June 30, 2025	July 1, 2021 - June 30, 2024	July 1, 2020 - June 30, 2023
Number of shares	204,903	197,128	258,000
TSR as-of date	August 1, 2022	August 2, 2021	August 27, 2020
Stock-based compensation	\$8.6 million	\$8.6 million	\$6.9 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. We have treated the 2012 ESPP as a compensatory plan.

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During fiscal 2022, employees purchased 316,861 shares under this program at a weighted average exercise price of \$33.00 per share, which represented a weighted average discount of \$6.13 per share from the fair value of the stock purchased. As of December 31, 2022, 1,476,211 shares remained available for issuance.

**Note 13—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 31, 2022	December 25, 2021	December 26, 2020
Weighted average grant date per share fair value of RSUs granted	\$ 34.83	\$ 36.12	\$ 25.96
Total intrinsic value of stock options exercised	—	3,179	4,688
Fair value of RSUs vested	42,324	54,948	42,597

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 31, 2022	December 25, 2021	December 26, 2020
Stock-based compensation expense included in:			
Cost of revenues	\$ 3,807	\$ 5,200	\$ 3,951
Research and development	8,217	7,583	5,824
Selling, general and administrative	19,313	16,601	14,055
Total stock-based compensation	<u>\$ 31,337</u>	<u>\$ 29,384</u>	<u>\$ 23,830</u>
Stock-based compensation tax benefit	<u>\$ 2,772</u>	<u>\$ 6,118</u>	<u>\$ 4,962</u>

**Unrecognized Stock-Based Compensation Expense**

Unrecognized stock-based compensation expense at December 31, 2022 consisted of the following (in thousands):

	Unrecognized Expense	Weighted Average Recognition Period (Years)
Restricted stock units	\$ 45,726	2.1
Performance restricted stock units	12,216	2.0
Employee stock purchase plan	424	0.1
Total unrecognized stock-based compensation expense	<u>\$ 58,366</u>	2.1

**Valuation Assumptions**

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
<b>PRSUs:</b>			
Dividend yield	— %	— %	— %
Expected volatility	53.0 %	52.5 %	52.0 %
Risk-free interest rate	2.8 %	0.3 %	0.2 %
Expected life (in years)	2.9	2.9	2.8

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
<b>Employee Stock Purchase Plan:</b>			
Dividend yield	— %	— %	— %
Expected volatility	42.6% - 60.8%	33.6% - 74.4%	30.4% - 74.4%
Risk-free interest rate	0.1% - 3.0%	0.1% - 1.5%	0.1% - 1.5%
Expected life (in years)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0

**Note 14—Income Taxes**

**Components of Income Before Income Taxes**

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
United States	\$ 30,047	\$ 74,298	\$ 72,950
Foreign	27,823	24,202	12,225
	<u>\$ 57,870</u>	<u>\$ 98,500</u>	<u>\$ 85,175</u>

**Provision for Income Taxes**

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
<b>Current provision:</b>			
Federal	\$ 4,330	\$ 2,334	\$ 1,799
State	520	712	1,194
Foreign	8,625	7,661	4,278
	<u>13,475</u>	<u>10,707</u>	<u>7,271</u>
<b>Deferred provision (benefit):</b>			
Federal	(5,886)	4,651	1,472
State	118	522	(267)
Foreign	(575)	(1,304)	(1,824)
	<u>(6,343)</u>	<u>3,869</u>	<u>(619)</u>
<b>Total provision for income taxes</b>	<u>\$ 7,132</u>	<u>\$ 14,576</u>	<u>\$ 6,652</u>

**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 from income taxes (in thousands):

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
U.S. statutory federal tax rate	\$ 12,153	\$ 20,685	\$ 17,887
State taxes and credits, net of federal benefit	16	811	663
Stock-based compensation	(2,772)	(6,118)	(4,962)
Research and development credits	(8,264)	(7,153)	(6,576)
Foreign taxes at rates different than the U.S.	2,404	2,286	415
Other permanent differences	1,964	2,043	400
Global intangible low-taxed income	7	—	—
Foreign derived intangible income	(5,160)	(2,486)	(3,668)
Change in valuation allowance	2,597	2,231	1,862
Tax contingencies, net of reversals	3,124	2,812	2,712
Other	1,063	(535)	(2,081)
Total	<u>\$ 7,132</u>	<u>\$ 14,576</u>	<u>\$ 6,652</u>

**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 31, 2022	December 25, 2021
Tax credits	\$ 33,025	\$ 41,650
Inventory reserve	14,269	13,691
Other reserves and accruals	6,527	8,523
Non-statutory stock options	3,180	2,837
Lease liability	6,024	6,717
Research and development expenditures capitalization	36,821	19,553
Net operating loss carryforwards	18,173	18,395
Gross deferred tax assets	<u>118,019</u>	<u>111,366</u>
Valuation allowance	<u>(43,295)</u>	<u>(40,698)</u>
Total deferred tax assets	74,724	70,668
Right-of-use assets	(5,219)	(5,910)
Acquired intangibles and fixed assets	(4,342)	(6,163)
Unrealized investment gains	(103)	(105)
Tax on undistributed earnings	(146)	(118)
Total deferred tax liabilities	<u>(9,810)</u>	<u>(12,296)</u>
Net deferred tax assets	<u>\$ 64,914</u>	<u>\$ 58,372</u>

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. As of December 31, 2022, we maintained a valuation allowance of \$43.3 million, primarily related to California deferred tax assets and foreign tax credit carryovers, due to uncertainty about the future realization of these assets. We believe that future reversals of taxable temporary differences, and our forecast of continued earnings in both our U.S. and non-U.S. jurisdictions, support our decision to not record a valuation allowance on other deferred tax assets.

**Tax Credits and Carryforwards**

Tax credits and carryforwards available to us at December 31, 2022 consisted of the following (in thousands):

	Amount	Latest Expiration Date
Federal research and development tax credit	\$ 26,424	2034-2042
Foreign tax credit carryforwards	995	2023-2027
California research credits	52,131	Indefinite
State net operating loss carryforwards	249,087	2025-Indefinite
Singapore net operating loss carryforwards	5,724	Indefinite

**Undistributed Earnings**

As of December 31, 2022, unremitted earnings of foreign subsidiaries was estimated at \$48.7 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 \$36.7 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 change because of the complexity and variety of assumptions necessary to compute the tax.

**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 31, 2022	December 25, 2021	December 26, 2020
Unrecognized tax benefit, beginning balance	\$ 35,745	\$ 32,497	\$ 28,800
Additions based on tax positions related to the current year	3,868	3,201	3,072
Additions based on tax positions from prior years	795	124	702
Reductions for tax positions of prior years	—	—	—
Reductions due to lapse of the applicable statute of limitations	(310)	(77)	(77)
Unrecognized tax benefit, ending balance	<u>\$ 40,098</u>	<u>\$ 35,745</u>	<u>\$ 32,497</u>
Interest and penalties recognized as a component of provision for income taxes	\$ 30	\$ 40	\$ 50
Interest and penalties accrued at period end	85	188	204

Of the unrecognized tax benefits at December 31, 2022, \$20.2 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 31, 2022, 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 31, 2022, our tax years 2019 through 2022, 2018 through 2022 and 2017 through 2022, 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 15—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 2022, 2021 and 2020 aggregated to \$2.7 million, \$2.7 million and \$2.2 million, respectively.

**Note 16—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 2022			
	Probe Cards	Systems	Corporate and Other	Total
Revenues	\$ 591,422	\$ 156,515	\$ —	\$ 747,937
Gross profit	235,562	80,937	(20,490)	296,009
Gross margin	39.8 %	51.7 %		39.6 %

	Fiscal 2021			
	Probe Cards	Systems	Corporate and Other	Total
Revenues	\$ 633,281	\$ 136,393	\$ —	\$ 769,674
Gross profit	279,873	65,834	(22,940)	322,767
Gross margin	44.2 %	48.3 %		41.9 %

	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 %

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 and fixed assets 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.

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
Taiwan	22.7 %	24.2 %	21.7 %
China	21.5	21.2	25.2
United States	17.1	15.9	18.4
South Korea	14.9	16.0	12.5
Malaysia	6.7	6.4	1.6
Singapore	5.3	4.7	2.4
Europe	5.2	5.7	9.5
Japan	5.1	4.7	6.3
Rest of World	1.5	1.2	2.4
Total Revenues	<u>100.0 %</u>	<u>100.0 %</u>	<u>100.0 %</u>

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

	Fiscal Year Ended		
	December 31, 2022	December 25, 2021	December 26, 2020
Foundry & Logic	\$ 409,196	\$ 435,812	\$ 446,183
DRAM	133,446	156,049	109,734
Flash	48,780	41,420	25,822
Systems	156,515	136,393	111,877
Total revenues	<u>\$ 747,937</u>	<u>\$ 769,674</u>	<u>\$ 693,616</u>

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

	Fiscal Year Ended								
	December 31, 2022			December 25, 2021			December 26, 2020		
	Probe Cards	Systems	Total	Probe Cards	Systems	Total	Probe Cards	Systems	Total
Products transferred at a point in time	\$ 587,738	\$ 144,456	\$ 732,194	\$ 630,038	\$ 124,788	\$ 754,826	\$ 579,569	\$ 104,858	\$ 684,427
Services transferred over time	3,684	12,059	15,743	3,243	11,605	14,848	2,170	7,019	9,189
Total	<u>\$ 591,422</u>	<u>\$ 156,515</u>	<u>\$ 747,937</u>	<u>\$ 633,281</u>	<u>\$ 136,393</u>	<u>\$ 769,674</u>	<u>\$ 581,739</u>	<u>\$ 111,877</u>	<u>\$ 693,616</u>

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 31, 2022	December 25, 2021	December 26, 2020
United States	\$ 406,529	\$ 372,338	\$ 347,654
Europe	42,640	47,700	51,791
Asia-Pacific	10,236	10,368	7,322
Total	<u>\$ 459,405</u>	<u>\$ 430,406</u>	<u>\$ 406,767</u>

**Note 17—New Accounting Pronouncements**

*ASU 2021-08*

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers*. The new guidance requires contract assets and contract liabilities acquired in a business combination to be recognized and measured by the acquirer on the acquisition date in accordance with Accounting Standards Codification 606, "Revenue from Contracts with Customers," as if it had originated the contracts. The Company

elected to early adopt on a prospective basis during the second quarter of fiscal 2022. The adoption did not have a material effect on the Company's Consolidated Financial Statements.

**Note 18-Subsequent Events**

In January 2023, we received \$18.0 million in cash from a California competes grant (the "Grant") awarded from the California Governor's Office of Business and Economic Development. The Grant requires FormFactor to create and maintain full-time jobs and make significant infrastructure investments within California over a 5-year term. If we do not meet the requirements of the Grant, we will be required to repay all or a portion of the Grant.

**SEVENTH AMENDMENT TO LEASE**  
(Extension of Lease Term and Modification of Lease)

THIS SEVENTH AMENDMENT TO Lease ("**Amendment**") is executed as of the 5th day of June, 2018, between NIMBUS CENTER LLC, a Delaware limited liability company ("**Landlord**") and FORMFACTOR BEAVERTON, INC., an Oregon corporation ("**Tenant**").

**RECITALS**

A. Landlord (as successor-in-interest to OR-Nimbus Corporate Center, L.L.C., as successor in interest to Spieker Properties, L.P., a California limited partnership) and Tenant (formerly known as Cascade Microtech, Inc.) are parties to that certain lease dated as of April 2, 1999 (the "**Original Lease**"), as amended by First Amendment dated as of January 10, 2007 (the "**First Amendment**"), Second Amendment to Lease dated as of February 25, 2013 (the "**Second Amendment**"), Third Amendment to Lease dated as of January 23, 2014 (the "**Third Amendment**"), Fourth Amendment to Lease dated as of March 31, 2014 (the "**Fourth Amendment**"), Fifth Amendment to Lease dated as of September 24, 2014 (the "**Fifth Amendment**") and Sixth Amendment to Lease dated as of July 8, 2015 (the "**Sixth Amendment**") (the Original Lease, as amended by such amendments, being referred to hereinafter as the "**Lease**") pursuant to which Tenant presently leases from Landlord the following premises:

- i. 58,817 rentable square feet of space (the "**Building 6 Premises**") comprising all of the rentable area of the building located at 9100 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 6 ("**Building 6**"),
- ii. 17,293 rentable square feet of space (the "**Building 3 Premises**") in the building located at 9500 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 3 ("**Building 3**") (which Building 3 Premises is comprised of 12,173 RSF in Suite 9500 and 5,120 RSF in Suite 100A),
- iii. 14,348 rentable square feet of space (the "**Building 9 Premises**") in the building located at 9203 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 9 ("**Building 9**") (which Building 9 Premises is comprised of 1,602 RSF in Suite 9203B, 3,634 RSF in Suite 9205, 6,799 RSF in Suite 9215 and 2,313 RSF in Suite 9225), and
- iv. 8,488 rentable square feet of space (the "**Building 8 Premises**") in the building located at 9000 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 8 ("**Building 8**") (which Building 8 Premises is comprised of Suites 9090 and Suite 9040).

The Building 6 Premises, the Building 3 Premises, the Building 9 Premises and the Building 8 Premises are referred to herein collectively as the "**Premises**" and constitute all of the space covered by the Lease as of the date of this Amendment. Building 6, Building 3, Building 9 and Building 8 are sometimes referred to individually in this Amendment as a "**Building**." The parties agree that, for all purposes of the Lease, the total rentable square footage of the Lease is deemed to be 98,946 rentable square feet of space. All capitalized terms not otherwise defined herein shall have the meaning given them in the Lease. The present expiration date of the Lease as to the Building 6 Premises and the Building 9 Premises is December 31, 2019, the present expiration date of the Lease as to the Building 3 Premises is March 31, 2020, and the present expiration date of the Lease as to the Building 8 Premises is September 30, 2020.

B. Landlord and Tenant presently desire to amend the Lease to (i) extend the expiration date of the Lease, as to the entire Premises, through and including December 31, 2027, (ii) modify the rent for the entire Premises effective as of October 1, 2018, (iii) provide Tenant with a construction allowance to be used by Tenant for renovations to be performed by Tenant in the Premises, (iv) grant Tenant an option to lease expansion space in either Building 3 or 9, provided such space can be made available, (v) grant Tenant the right to terminate this Amendment if Tenant elects to lease such expansion space but Landlord does not commit to provide the expansion space within the required delivery period, (vi) grant Tenant two (2) consecutive renewal options of five (5) years each, (vii) grant Tenant an ongoing right of first offer for available space in Building 8 and Building 3, and (viii) document certain other modifications to the Lease agreed to by Landlord and Tenant, all as more fully provided below.

NOW, THEREFORE, in consideration of the foregoing, the parties hereby agree as follows:

1. New Term. The term of the Lease, as to the entire Premises (i.e., 98,946 RSF) is hereby extended through and including December 31, 2027 (the "**Expiration Date**"). The period commencing on October 1, 2018, and ending on the Expiration Date is referred to hereinafter as the "**New Term**." During the New Term, all of the existing provisions of the Lease shall continue to apply, except to the extent otherwise expressly provided in this Amendment.

2. Rent for New Term. Notwithstanding anything to the contrary in the Lease, effective as of October 1, 2018, and continuing throughout the New Term, the Base Rent for the Premises (under Section 6 of the Lease) and Tenant's obligation to pay Tenant's Proportionate Share of Operating Expenses for the Premises (under Sections 6.B. and 7 of the Lease, with the definition of Project being as provided in Section 4 of the First Amendment) shall be as set forth below:

a. Building 6 Premises (58,817 RSF).

i. Base Rent.

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
10/1/18 through 12/31/18	\$14.00	\$68,619.83***
1/1/19 through 12/31/19	\$14.42	\$70,678.43***
1/1/20 through 12/31/20	\$14.85	\$72,786.04
1/1/21 through 12/31/21	\$15.30	\$74,991.68
1/1/22 through 12/31/22	\$15.76	\$77,246.33
1/1/23 through 12/31/23	\$16.23	\$79,549.99
1/1/24 through 12/31/24	\$16.72	\$81,951.69
1/1/25 through 12/31/25	\$17.22	\$84,402.40
1/1/26 through 12/31/26	\$17.74	\$86,951.13
1/1/27 through 12/31/27	\$18.27	\$89,548.88

\*\*\*Notwithstanding the above, provided that Tenant is not in breach of the Lease beyond any applicable notice and cure period during such period, Tenant's Monthly Base Rent for the Building 6 Premises shall be fully abated for the months of October of 2018, and February, May and August, 2019 (collectively that "**Rent Abatement Months**"), for a total of four (4) months of Base Rent abatement.

ii. Operating Expenses. Tenant's Proportionate Share of the Project as to the Building 6 Premises shall be 8.5267% throughout the New Term (based on 58,817 RSF).

b. Building 3 Premises (17,293 RSF).

i. Base Rent

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
10/1/18 through 12/31/18	\$14.00	\$20,175.17***
1/1/19 through 12/31/19	\$14.42	\$20,780.42***
1/1/20 through 12/31/20	\$14.85	\$21,400.09
1/1/21 through 12/31/21	\$15.30	\$22,048.58
1/1/22 through 12/31/22	\$15.76	\$22,711.47
1/1/23 through 12/31/23	\$16.23	\$23,388.78
1/1/24 through 12/31/24	\$16.72	\$24,094.91
1/1/25 through 12/31/25	\$17.22	\$24,815.46
1/1/26 through 12/31/26	\$17.74	\$25,564.82
1/1/27 through 12/31/27	\$18.27	\$26,328.59

\*\*\*Notwithstanding the above, provided that Tenant is not in breach of the Lease beyond any applicable notice and cure period during such period, Tenant's Monthly Base Rent for the Building 3 Premises shall be fully abated for the Rent Abatement Months (as defined in Paragraph 2.a.i. above), for a total of four (4) months of Base Rent abatement.

ii. Operating Expenses. Tenant's Proportionate Share of Project as to the Building 3 Premises shall be 2.5069% throughout the New Term (based on 17,293 RSF).

c. Building 9 Premises.

A. Office Space (12,746 RSF)

i. Base Rent (office space)

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
10/1/18 through 12/31/18	\$14.00	\$14,870.33***
1/1/19 through 12/31/19	\$14.42	\$15,316.44***
1/1/20 through 12/31/20	\$14.85	\$15,773.18
1/1/21 through 12/31/21	\$15.30	\$16,251.15
1/1/22 through 12/31/22	\$15.76	\$16,739.75
1/1/23 through 12/31/23	\$16.23	\$17,238.97
1/1/24 through 12/31/24	\$16.72	\$17,759.43
1/1/25 through 12/31/25	\$17.22	\$18,290.51
1/1/26 through 12/31/26	\$17.74	\$18,842.84
1/1/27 through 12/31/27	\$18.27	\$19,405.79

\*\*\*Notwithstanding the above, provided that Tenant is not in breach of the Lease beyond any applicable notice and cure period during such period, Tenant's Monthly Base Rent for the Building 9 Premises (office space) shall be fully abated for the Rent Abatement Months (as defined in Paragraph 2.a.i. above), for a total of four (4) months of Base Rent abatement.

ii. Operating Expenses (office space). Tenant's Proportionate Share of Project as to the Building 9 Premises office space shall be 1.8477% throughout the New Term (based on 12,746 RSF).

B. Warehouse Space (1,602 RSF)

i. Base Rent (warehouse space)

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
10/1/18 through 9/30/19	\$5.56	\$742.26
10/1/19 through 9/30/20	\$5.73	\$764.53
10/1/20 through 9/30/21	\$5.90	\$787.46
10/1/21 through 9/30/22	\$6.08	\$811.09
10/1/22 through 9/30/23	\$6.26	\$835.42
10/1/23 through 9/30/24	\$6.45	\$860.48
10/1/24 through 9/30/25	\$6.64	\$886.30
10/1/25 through 9/30/26	\$6.84	\$912.89
10/1/26 through 9/30/27	\$7.04	\$940.27
10/1/27 through 12/31/27	\$7.25	\$968.48

ii. Operating Expenses (warehouse space). Tenant's Proportionate Share of Project as to the Building 9 Premises warehouse space shall be 0.2322% throughout the New Term (based on 1,602 RSF).

d. Building 8 Premises (8,488 RSF).

i. Base Rent.

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
10/1/18 through 12/31/18	\$14.00	\$9,902.67***
1/1/19 through 12/31/19	\$14.42	\$10,199.75***
1/1/20 through 12/31/20	\$14.85	\$10,503.90
1/1/21 through 12/31/21	\$15.30	\$10,822.20
1/1/22 through 12/31/22	\$15.76	\$11,147.57
1/1/23 through 12/31/23	\$16.23	\$11,480.02
1/1/24 through 12/31/24	\$16.72	\$11,826.61

1/1/25 through 12/31/25	\$17.22	\$12,180.28
1/1/26 through 12/31/26	\$17.74	\$12,548.09
1/1/27 through 12/31/27	\$18.27	\$12,922.98

\*\*\*Notwithstanding the above, provided that Tenant is not in breach of the Lease beyond any applicable notice and cure period during such period, Tenant's Monthly Base Rent for the Building 8 Premises shall be fully abated for the Rent Abatement Months (as defined in Paragraph 2.a.i. above), for a total of four (4) months of Base Rent abatement.

ii. Operating Expenses. Tenant's Proportionate Share of Project as to the Building 8 Premises shall be 1.2304% throughout the New Term (based on 8,488 RSF).

3. Renovation Alterations; Landlord's Allowance. Except with regard to the disbursement of Landlord's Allowance (as defined in Paragraph 3.b.i. below), Landlord shall have no obligation to make or pay for any improvements or renovations in or to any portion of the Premises as a result of the extension of the Lease term for the New Term and Tenant accepts the Premises in its as-is condition.

a. Renovation Alterations. The parties acknowledge that Tenant intends to make certain alterations and improvements to the Premises following the date hereof (the "**Renovation Alterations**"). The construction of the Renovation Alterations by Tenant shall be performed in accordance with Section 12 of the Lease (as amended) and the provisions of this Paragraph 3. The general contractor selected by Tenant to construct the Renovation Alterations, and reasonably approved by Landlord, is referred to hereinafter as "**Tenant's Contractor**." The subcontractors performing work on the Renovation Alterations shall also be subject to Landlord's reasonable approval. The Renovation Alterations shall be performed diligently and in a first-class workmanlike manner and in accordance with plans and specifications reasonably approved by Landlord, and shall comply with all legal requirements and Landlord's construction standards, procedures, conditions and requirements for the Building (including, without limitation, Landlord's requirements relating to insurance). The final coordinated set of architectural, structural, mechanical, electrical and plumbing working drawings, in form sufficient for Tenant's Contractor to obtain subcontractors bids on the work and to obtain all applicable permits for the work, as approved in writing by Landlord and Tenant, are referred to hereinafter as the "**Construction Drawings**."

b. Landlord's Allowance; Disbursement Procedure.

i. Landlord's Allowance. Notwithstanding anything to the contrary in Section 12 of the Lease, Landlord shall contribute toward the cost of the design, construction and installation of the Renovation Alterations (including, without limitation, Tenant's Contractor's fee) an amount not to exceed Thirteen and 50/100 Dollars (\$13.50) per rentable square foot of all of the Premises except Suite 9203B in Building 9 (which, based on the 97,344 RSF, totals One Million Three Hundred Fourteen Thousand One Hundred Forty Four Dollars (\$1,314,144.00) (the "**Landlord's Allowance**"). Landlord's Allowance may be applied by Tenant to the Renovation Alterations performed in any portion of the Premises in which Tenant is performing Renovation Alterations. At Tenant's option, a portion of Landlord's Allowance not to exceed a total amount of Seven Hundred Seventy-Eight Thousand Seven Hundred Fifty-Two Dollars (\$778,752.00) may be applied to Tenant's rental obligations under the Lease, provided that Landlord's Allowance may not be used for more than one (1) month of rental abatement in any calendar quarter. For avoidance of doubt, Landlord's Allowance shall be available for disbursement to Tenant in the manner provided in this Paragraph 4.b. without regard to whether the disbursement will occur during any of the Rent Abatement Months (as defined in Paragraphs 2.a.i. above). Notwithstanding the foregoing, no disbursements of Landlord's Allowance shall be made (or applied to Tenant's rental obligations) prior to October 1, 2018, or such earlier date as Tenant waives in writing Tenant's right to terminate this Amendment pursuant to Paragraph 4.d. below. Further, notwithstanding anything to the contrary herein, any portion of Landlord's Allowance that has not been applied to the cost of construction of the Renovation Alterations (in accordance with the disbursement provisions of Paragraph 3.b.ii. below) and/or to Tenant's rental obligations (in the manner permitted above) on or before December 31, 2020 (the "**Outside Disbursement Date**"), shall be forfeited by Tenant. For avoidance of doubt, if Tenant desired to apply unused portions of Landlord's Allowance to rental obligations and such unused amounts were not fully applied to rental by the Outside Disbursement Date due to the limits on the amount that may be applied to rental in any calendar quarter, then such unapplied amount shall be forfeited. Notwithstanding anything to the contrary above, Tenant shall not be entitled to receive (and Landlord shall have no obligation to disburse or to apply to rental) all or any portion of Landlord's Allowance if Tenant is in default under the Lease at the time Tenant requests such disbursement; provided, however, that if Landlord did not make a disbursement because Tenant was then in default under this Lease, Landlord shall make the disbursement at such time as the default is cured, provided that all other conditions for the disbursement hereunder have been met prior to the Outside Disbursement Date.

ii. Disbursement of Landlord's Allowance. Landlord shall disburse Landlord's Allowance directly to Tenant, Tenant's Contractor and/or to the applicable subcontractors, as specified by Tenant. Landlord's disbursements shall be on a monthly basis and shall be made within thirty (30) days after Landlord's receipt of (A) invoices of Tenant's Contractor to be furnished to Landlord by Tenant covering work actually performed, construction in place and materials delivered to the site (as may be applicable) describing in reasonable detail such work, construction and/or materials, (B) a certificate from Tenant's architect certifying that the work evidenced by such invoices has been performed in accordance with the Construction Drawings, (C) conditional lien waivers executed by Tenant's Contractor, subcontractors or suppliers, as applicable, for their portion of the work covered by the requested disbursement, and (D) unconditional lien waivers executed by Tenant's Contractor and the persons and entities performing the work or supplying the materials covered by Landlord's previous disbursements for the work or materials covered by such previous disbursements (all such waivers to be in the forms prescribed by the applicable governmental codes). No payment will be made for materials or supplies not located in the Premises. Landlord may withhold the amount of any and all retentions provided for in original contracts or subcontracts until expiration of the applicable lien periods or Landlord's receipt of unconditional lien waivers and full releases upon final payment (in the form prescribed by the applicable provisions of the applicable governmental codes) from Tenant's Contractor and all subcontractors and suppliers involved in the Renovation Alterations.

Tenant shall pay for all costs of the construction of the Renovation Alterations in excess of Landlord's Allowance (the "**Excess Cost**"). Based on the estimated cost of the construction of the Renovation Alterations, as shown on the budget for the construction of the Renovation Alterations (as reasonably approved by Landlord and Tenant) (the "**Estimated Costs**"), the pro-rata share of the Estimated Costs payable by Landlord and Tenant shall be determined and an appropriate percentage share established for each (a "**Share of Costs**"). Tenant and Landlord shall fund the cost of the construction (including the applicable portion of the applicable fees) as the same is performed, in accordance with their respective Share of Costs for the construction, with such payments being made directly to Tenant's Contractor and/or the applicable subcontractors. At such time as Landlord's Allowance has been entirely disbursed, Tenant shall pay the remaining Excess Cost, if any, directly to Tenant's Contractor and/or the applicable subcontractors. Tenant shall furnish to Landlord copies of receipted invoices for all payments made directly by Tenant for the costs of the Renovation Alterations and such waivers of lien rights as Landlord may reasonably require.

4. Expansion Option: Amendment Termination Option.

a. Expansion Option: Tenant's Expansion Exercise Notice. Subject to the terms and condition of this Paragraph 4, Tenant shall have the option (the "**Expansion Option**") to lease additional space in either Building 3 or Building 9 (with the selection of either Building 3 or Building 9 to be at Landlord's discretion) which space shall consist of between 19,000 rentable square feet of space and 27,000 rentable square feet of space (as determined by Landlord) (such expansion space, as determined by Landlord, being referred to herein as the "**Expansion Space**"). If Tenant desires to lease the Expansion Space, Tenant shall notify Landlord thereof in writing on or before July 15, 2018 ("**Tenant's Expansion Exercise Notice**"). If Tenant fails to deliver Tenant's Expansion Exercise Notice on or before July 15, 2018, this Paragraph 4 shall be deleted from this Amendment and Tenant shall no longer have an Expansion Option, but the Lease, as amended by this Amendment (excepting this Paragraph 4), shall otherwise remain in full force and effect.

b. Landlord's Determination Notice. If Tenant timely delivers Tenant's Expansion Exercise Notice, Landlord shall notify Tenant in writing ("**Landlord's Expansion Determination Notice**"), on or before September 15, 2018, of one of the following (i) that the Expansion Space will be located in Building 3 and the approximate rentable square footage of the Expansion Space, or (ii) that the Expansion Space will be located in Building 9 and the approximate rentable square footage of the Expansion Space or (iii) that Landlord is unable to deliver the Expansion Space. If Landlord's Expansion Determination Notice specified item (i) or (ii) of the immediately preceding sentence, then Paragraph 4.c. below shall apply, and, if Landlord's Expansion Determination Notice specified item (iii) of the immediately preceding sentence, then Paragraph 4.d. below shall apply.

c. Delivery of Expansion Space. If Landlord's Expansion Determination Notice was for item (i) or (ii) under Paragraph 4.b. above, then Landlord and Tenant shall promptly enter into an amendment to the Lease which adds the Expansion Space to the Premises on all of the terms applicable to the existing Premises, except as follows:

(i) Delivery; Term. The term of the Lease of the Expansion Space shall commence on the date the Expansion Space is delivered to Tenant in its then "as-is" condition (the

"**Expansion Space Commencement Date**"), which Expansion Space Commencement Date shall be a date selected by Landlord that is between April 1, 2019, and September 30, 2019.

(ii) **Base Rent.** The Base Rent for the Expansion Space (under Section 6 of the Lease) shall be at the same rate per rentable square foot that applies to Tenant's then existing office space under the Lease, as the same adjusts from time to time, with such Base Rent to commence on the date that is one hundred eighty (180) days following the Expansion Space Commencement Date (the "**Expansion Space Rent Commencement Date**"), and, if Tenant completes its improvements to the Expansion Space prior to the Expansion Space Rent Commencement Date, Tenant may conduct business therein rent free until the Expansion Space Rent Commencement Date.

(iii) **Operating Expenses.** Tenant's Proportionate Share of Operating Expenses (for purposes of Sections 6.B. and 7 of the Lease) as to the Expansion Space shall be determined by dividing the rentable square footage of the Expansion Space by the rentable square footage of the Project.

(iv) **Expansion Alterations.** Tenant shall construct alterations to the Expansion Space (the "**Expansion Alterations**") in accordance with the provisions that are set forth in Paragraph 3.a. above with regard to Tenant's construction of the Renovation Alterations in the existing Premises, except that Landlord's Allowance (as defined in Paragraph 3.b.i. above) shall be inapplicable and the construction allowance for the Expansion Alterations shall instead be the Expansion Allowance and Additional Allowance provided for in item (v) below.

(v) **Expansion Allowance: Additional Allowance.** Landlord shall contribute toward the cost of the design, construction and installation of the Expansion Alterations (including, without limitation, Tenant's Contractor's fee) an amount not to exceed Fifteen Dollars (\$15.00) per rentable square foot of the Expansion Space (the "**Expansion Allowance**"). If the cost of the Expansion Alterations exceeds the Expansion Allowance, then Landlord will, upon Tenant's written request, contribute toward such excess sum an amount not to exceed Ten Dollars (\$10.00) per rentable square foot of the Expansion Space (the "**Additional Allowance**"). Upon the completion of the Expansion Alterations and the determination of the actual amount (if any) of the Additional Allowance that was disbursed by Landlord pursuant to the foregoing (the "**Amortization Amount**"), Landlord and Tenant will enter into a further amendment to the Lease which increases the monthly Base Rent by a sum sufficient to fully amortize the Amortization Amount over the then remaining term of the Lease, which amortization shall be at an interest rate of eight percent (8%) per annum. Such amendment shall also provide that, if the Lease terminates prior to the date that the Amortization Amount plus accrued interest is fully repaid to Landlord, then, concurrently with such termination of the Lease, the then unpaid portion of the Amortization Amount, plus all accrued but unpaid interest, shall be immediately payable in full. The disbursement of the Expansion Allowance and Additional Allowance shall be in accordance with the provisions as set forth in Paragraph 3.b.i. and ii. above with regard to the disbursement of Landlord's Allowance for the existing Premises, except that (x) no portion of the Expansion Allowance may be applied to Base Rent and (y) the Outside Disbursement Date as to the Expansion Allowance and the Additional Allowance shall be the date twelve (12) months following the Expansion Space Commencement Date.

If, for any reason, the parties fail to execute such amendment, such failure shall not modify in any way the obligations of the parties with regard to the Expansion Space, as set forth herein.

d. **Tenant's Amendment Termination Option.** If Landlord's Expansion Determination Notice was for item (iii) in Paragraph 4.b. above, or if Landlord fails to deliver an Expansion Determination Notice to Tenant on or before September 15, 2018, then Tenant shall no longer have a right to Lease the Expansion Space, and Tenant shall instead have the option to terminate this Amendment (the "**Amendment Termination Option**"), which Amendment Termination Option shall be exercised by Tenant, if at all, by written notice given by Tenant to Landlord not later than September 30, 2018. If Tenant timely exercises the Amendment Termination Option, the Lease shall continue in effect as if this Amendment had not been executed. If Tenant does not timely exercise the Amendment Termination Option, then all of the terms of this Amendment shall continue in full force and effect, except that the Expansion Option shall not apply.

5. Renewal Options. This Paragraph 5 replaces any and all renewal options presently provided for in the Lease.

a. Renewal Options; Conditions. Subject to the terms and condition of this Paragraph 5, Tenant shall have the right (the "**Renewal Options**") to extend the term of the Lease for two (2) consecutive renewal terms of five (5) years each (each a "**Renewal Term**") commencing on the expiration of the New Term, and on the expiration of the first Renewal Term, as applicable, subject to the following conditions:

i. Tenant shall exercise a Renewal Option, if at all, by written notice to Landlord (the "**Initial Renewal Notice**") given no earlier than fifteen (15) months prior to the commencement date of the subject Renewal Term and not later than twelve (12) months prior to the commencement date of the subject Renewal Term; and

ii. Tenant shall not be in default under the Lease beyond any applicable cure periods at the time that Tenant delivers its Initial Renewal Notice or at the time Tenant delivers its Binding Notice (as those terms are defined below); and

iii. No more than 20,000 rentable square feet of the then Premises is sublet at the time that Tenant delivers its Initial Renewal Notice or at the time Tenant delivers its Binding Notice; and

iv. The Lease has not been assigned prior to the date that Tenant delivers its Initial Renewal Notice or prior to the date Tenant delivers its Binding Notice.

b. Terms Applicable to Premises During Renewal Term.

i. The initial Base Rent rate per rentable square foot for the Premises during the Renewal Term shall equal the Prevailing Market (hereinafter defined) rate per rentable square foot for the Premises. Base Rent during the Renewal Term shall increase, if at all, in accordance with the increases assumed in the determination of Prevailing Market rate. Base Rent attributable to the Premises shall be payable in monthly installments in accordance with the terms and conditions of Section 6 of the Lease (as amended).

ii. Tenant shall pay Additional Rent (i.e. Operating Expenses) for the Premises during the Renewal Term in accordance with Section 6 and Section 7 of the Lease (as amended), and the manner and method in which Tenant reimburses Landlord for Tenant's share of Operating Expenses and the base year, if any, applicable to such matter, shall be some of the factors considered in determining the Prevailing Market rate for the Renewal Term.

c. Procedure for Determining Prevailing Market. Within thirty (30) days after receipt of Tenant's Initial Renewal Notice for a Renewal Option, Landlord shall advise Tenant of the applicable Base Rent rate for the Premises for the subject Renewal Term. Tenant, within fifteen (15) days after the date on which Landlord advises Tenant of the applicable Base Rent rate for the Renewal Term, shall either (i) give Landlord final binding written notice ("**Binding Notice**") of Tenant's exercise of its Renewal Option, or (ii) if Tenant disagrees with Landlord's determination, provide Landlord with written notice of rejection (the "**Rejection Notice**"). If Tenant fails to provide Landlord with either a Binding Notice or Rejection Notice within such fifteen (15) day period, Tenant's Renewal Option shall be null and void and of no further force and effect. If Tenant provides Landlord with a Binding Notice, Landlord and Tenant shall enter into the Renewal Amendment (as defined below) upon the terms and conditions set forth herein. If Tenant provides Landlord with a Rejection Notice, Landlord and Tenant shall work together in good faith to agree upon the Prevailing Market rate for the Premises during the Renewal Term. When Landlord and Tenant have agreed upon the Prevailing Market rate for the Premises, such agreement shall be reflected in a written agreement between Landlord and Tenant, whether in a letter or otherwise, and Landlord and Tenant shall enter into the Renewal Amendment in accordance with the terms and conditions hereof. If Landlord and Tenant are unable to agree in writing upon the Prevailing Market rate for the Premises within thirty (30) days after the date Tenant provides Landlord with the Rejection Notice, the Prevailing Market rate for the Premises shall be established by appraisal in accordance with the procedure set forth in Exhibit A attached hereto and such determination shall be binding.

d. Renewal Amendment. If Tenant is entitled to and properly exercises its Renewal Option, Landlord shall prepare an amendment (the "**Renewal Amendment**") to reflect changes in the Base Rent, term of the Lease, termination date and other appropriate terms. The Renewal Amendment shall be sent to Tenant within a reasonable time after Landlord's receipt of the Binding Notice or other

written agreement by Landlord and Tenant regarding the Prevailing Market rate, and Tenant shall execute and return the Renewal Amendment to Landlord within a reasonable time after Tenant's receipt of same, but, upon final determination of the Prevailing Market rate applicable during the Renewal Term as described herein, an otherwise valid exercise of the Renewal Option shall be fully effective whether or not the Renewal Amendment is executed.

e. Definition of Prevailing Market. For purposes of the Renewal Options, "Prevailing Market" shall mean the arms' length fair market annual rental rate per rentable square foot under renewal leases and amendments entered into on or about the date on which the Prevailing Market is being determined hereunder for space comparable to the Premises in the Project and office buildings comparable to the Building in the Beaverton, Oregon/Highway 217 submarket. The determination of Prevailing Market shall take into account any material economic differences between the terms of this Lease and any comparison lease or amendment, such as rent abatements, construction costs and other concessions and the manner, if any, in which the landlord under any such lease is reimbursed for operating expenses and taxes. The prevailing Market shall also include the then market leasing concessions, if any, such as construction allowances and free rent. The determination of Prevailing Market shall also take into consideration any reasonably anticipated changes in Prevailing Market rates over the relevant time period.

6. Right of First Offer. This Paragraph 6 replaces any and all rights of first offer or other expansion rights presently provided for in the Lease.

a. First Offer Right. Subject to the provisions of this Paragraph 6, throughout the New Term (but not during the final two (2) years of the New Term, unless the Lease term has been further extended in writing), Tenant shall have a continuing right of first offer (the "First Offer Right") to lease space in Building 3 or Building 8 that becomes "available for lease," as defined below (each a "First Offer Space"). The First Offer Space shall not be deemed "available for lease" if the tenant under an expiring lease of the First Offer Space desires to renew or extend its lease, whether pursuant to a renewal option or a new arrangement with Landlord, or if any tenant of the Building exercises an option or right of first offer to lease such space, which option or right of first offer existed as of the date of this Lease. Upon Landlord obtaining knowledge that a First Offer Space will be available for lease, Landlord shall send Tenant a written notice (the "First Offer Notice") which identifies the First Offer Space (including the rentable square footage thereof), sets forth Landlord's good faith determination of the Prevailing Market rate (as defined in Paragraph 5.e. above) for the First Offer Space and, if Prevailing Market terms include a tenant improvement allowance or other leasing concessions, Landlord's good faith determination of such allowance and other leasing concessions.

b. Exercise of First Offer Right. If Tenant receives a First Offer Notice for the First Offer Space and Tenant desires to lease the First Offer Space, Tenant shall so notify Landlord in writing ("Tenant's Exercise Notice") within seven (7) business days after Landlord's delivery of the First Offer Notice to Tenant, which Tenant's Exercise Notice shall advise Landlord that Tenant either (i) elects to lease the First Offer Space on the terms set forth in the First Offer Notice or (ii) elects to lease the First Offer Space, but desires to have the Prevailing Market rent and leasing concessions (if any) for the First Offer Space determined by appraisal in accordance with the procedures set forth in attached Exhibit A. If Tenant's Exercise Notice does not specify whether Tenant has selected (i) or (ii) from the immediately preceding sentence, Tenant shall be deemed to have selected item (i). If Tenant's Exercise Notice selected item (ii), then the parties shall comply with the appraisal procedures of Exhibit A to determine the Prevailing Market rent and the market leasing concessions (if any) for the First Offer Space (with the fifteen (15) day period referred to in the first sentence of Exhibit A being the fifteen (15) day period following the date of Tenant's Exercise Notice) and the results of the appraisal procedure shall be binding on the parties and Tenant may not revoke its exercise of the first offer right. Tenant must lease the entire First Offer Space and may not lease only a portion thereof.

If Tenant does not deliver a Tenant's Exercise Notice within the required seven (7) business day period, then Landlord shall have a period of six (6) months to lease the subject First Offer Space to a third party on any terms Landlord desires. If Landlord has not leased the subject First Offer Space to a third party within the aforementioned six (6) month period, then Landlord must again comply with the notice provisions of Paragraph 6.a. above prior to leasing the First Offer Space to a third party. If Tenant does not exercise its right of first offer and Landlord enters into a lease of the First Offer Space with a third party, Tenant's right of first offer shall again apply to the subject First Offer Space if such space becomes "available for lease" at a later date while the First Offer Right is in effect.

c. Terms and Conditions. If Tenant timely exercises its right to lease the First Offer Space, Landlord and Tenant shall promptly enter into an amendment of the Lease adding the First Offer Space to the Premises on all the terms and conditions set forth in this Lease as to the Premises then

demised hereunder, except that (i) the First Offer Space shall be delivered to Tenant in its then "as-is" condition, subject to Tenant receiving any tenant improvement allowance that is included in the First Offer Notice or established by the appraisal procedure (if applicable), (ii) the term of the lease to Tenant of the First Offer Space shall commence upon the date the First Offer Space is delivered to Tenant and shall expire concurrently with the expiration of the Lease as to the original Premises, (iii) the Base Rent payable by Tenant for the First Offer Space shall be the then-Prevailing Market rent as set forth in the First Offer Notice or established by the appraisal procedure (if applicable), and (iv) Tenant's Share for the First Offer Space shall be calculated by dividing the rentable square footage of the First Offer Space by the rentable square footage of the Project. For purposes of this Paragraph 6.c., the term "Prevailing Market" shall have the meaning set forth in Paragraph 5.e. above with references therein to the "Premises" being deemed to refer to the First Offer Space and disregarding any provisions which by their nature pertain only to the renewal term.

If Tenant exercises the First Offer Right as to a First Offer Space, Landlord does not guarantee that the First Offer Space will be available on the stated availability date for the lease thereof, if the then existing occupants of the First Offer Space shall hold-over, or for any other reason beyond Landlord's reasonable control, but Landlord shall deliver the First Offer Space to Tenant as soon as commercially reasonably possible after the stated availability date.

d. Delay in Determination of Base Rent. If the Prevailing Market rent is not established prior to the commencement of the Lease term as to a First Offer Space, then Tenant shall pay for the First Offer Space Base Rent under Section 6 of the Lease at the same rate per rentable square foot that Tenant then pays for the original Premises and, after the Prevailing Market rent has been determined, Tenant shall pay any deficiency in the amount paid by Tenant during such period, within thirty (30) days following the date Tenant receives from Landlord a written invoice for the amount of such deficiency, or, if Tenant paid excess rent during such period, Landlord shall credit such excess to the rent next due under the Lease.

e. Limitation on Tenant's Right of First Offer. Notwithstanding the foregoing, if (i) on the date of delivery of Tenant's Exercise Notice, or the date immediately preceding the date the Lease term for a First Offer Space is to commence, there exists an uncured event of default or there is a breach of this Lease by Tenant for which Tenant has received written notice from Landlord that subsequently matures into an event of default due to Tenant's failure to cure such breach within the applicable cure period, (ii) on the date immediately preceding the date the Lease term for the First Offer Space is to commence the Tenant originally named herein (a) is not in occupancy of the entire Premises then leased hereunder or (b) does not intend to occupy the entire Premises, together with the entire First Offer Space, then, at Landlord's option, the exercise of the right of first offer for the subject First Offer Space shall be null and void.

7. Exterior Building Signage for Buildings 3 and 8. The existing provisions of the Lease regarding exterior signage on Building 6 shall remain in full force and effect. Tenant's right to exterior signage on Buildings 3 and 8 shall be governed by the provisions of this Paragraph 7.

Tenant shall have the right to install one (1) exterior sign on each of Building 3, Building 6 and Building 8 (for a total of three (3) signs). Prior to installing an exterior sign pursuant to the foregoing, Tenant shall submit to Landlord reasonably detailed drawings of the proposed sign, including without limitation, the size, material, shape and lettering for review and approval by Landlord. The signs shall conform to the standards of design and motif established by Landlord for the exterior of the Project. The location of the signs shall be at Landlord's reasonable discretion. Tenant shall reimburse Landlord for any costs associated with Landlord's review and supervision, including, but not limited to, engineers and other professional consultants. Tenant will be responsible for the repair of any damage that the installation of the signs may cause to the subject Building or the Project. Tenant agrees upon the expiration date or sooner termination of the Lease as to the subject Building, upon Landlord's request, to remove the sign on such Building and to repair and restore any damage to the subject Building and the Project at Tenant's expense. In addition, Landlord shall have the right to remove the exterior signs at Tenant's sole cost and expense, if, at any time during the Term: (1) Tenant assigns its interest in the Lease, (2) Tenant ceases to occupy the portion of the Premises that are located in the subject Building (in which event Landlord may remove only the exterior sign that is on that particular Building), or (3) Tenant defaults under any term or condition of the Lease and fails to cure such default within any applicable grace period.

8. Parking. Effective as of the date hereof, the existing provisions of the Lease with regard to parking at the Project shall be deleted in their entirety and Tenant's rights to use parking spaces at the Project shall be governed solely by this Paragraph 8.

a. **Parking Spaces.** During the New Term (and any subsequent extension of the Lease term) Tenant shall have the right to license from Landlord, and Landlord agrees to license to Tenant, at no additional cost, for each of the Buildings, four (4) unassigned, first come-first served, parking spaces (“**Spaces**”) for each 1,000 rentable square feet of space leased by Tenant in the subject Building. The Spaces shall be located on the surface parking lot serving the subject Building (each such surface parking lot being referred to herein as the “**Parking Facility**”) and shall be only for the use of Tenant and its employees and guests. No deductions or allowances shall be made for days when Tenant or any of its employees does not utilize the Parking Facility or for Tenant utilizing less than all of the Spaces. Tenant shall not have the right to license or otherwise use more than the number of Spaces set forth above.

b. During the New Term (and any subsequent extension of the Lease term) Tenant shall retain the license to use those reserved Spaces in the parking Facilities that are held by Tenant as of the date of this Amendment, which reserved Spaces shall be deducted from the unassigned Spaces allocated to Tenant under Paragraph 8.a. above.

c. Landlord (and its affiliate) shall not be responsible for money, jewelry, automobiles or other personal property lost in or stolen from the Parking Facility regardless of whether such loss or theft occurs when the Parking Facility or any areas therein are locked or otherwise secured. Except as caused by the gross negligence or willful misconduct of Landlord (or its affiliate) and without limiting the terms of the preceding sentence, Landlord (and its affiliate) shall not be liable for any loss, injury or damage to persons using the Parking Facility or automobiles or other property therein, it being agreed that, to the fullest extent permitted by law, the use of the Spaces shall be at the sole risk of Tenant and its employees.

d. Landlord (or its affiliate) shall have the right from time to time to designate the location of the Spaces and to promulgate reasonable rules and regulations regarding the Parking Facility, if any, the Spaces and the use thereof, including, but not limited to, rules and regulations controlling the flow of traffic to and from various parking areas, the angle and direction of parking and the like. Tenant shall comply with and cause its employees to comply with all such rules and regulations as well as all reasonable additions and amendments thereto.

e. Tenant shall not store or permit its employees to store any automobiles in the Parking Facility without the prior written consent of Landlord (or its affiliate). Except for emergency repairs, Tenant and its employees shall not perform any work on any automobiles while located in the Parking Facility or on the Project. If it is necessary for Tenant or its employees to leave an automobile in the Parking Facility overnight, Tenant shall provide Landlord (or its affiliate) with prior notice thereof designating the license plate number and model of such automobile.

f. Landlord (or its affiliate) shall have the right to temporarily close the Parking Facility or certain areas therein in order to perform necessary repairs, maintenance and improvements to the Parking Facility or any portion thereof.

g. Tenant shall not assign or sublicense any of the Spaces without the prior written consent of Landlord (or its affiliate); provided, however, that the Spaces may be assigned or proportionately sublicensed in connection with the assignment of the Lease or a subletting of a portion of the Premises that is in compliance with the provisions of the Lease regarding assignment and subletting. Landlord (or its affiliate) shall have the right to terminate the parking agreement set forth in this Paragraph 8 with respect to any Spaces that Tenant desires to sublet or assign, except to the extent permitted under the immediately preceding sentence.

h. Landlord (or its affiliate) may elect to provide parking cards or keys to control access to the Parking Facility. In such event, Tenant shall be provided with one card or key for each Space that Tenant is leasing hereunder, provided that Landlord (or its affiliate) shall have the right to require Tenant or its employees to place a deposit on such access cards or keys and to pay a fee for any lost or damaged cards or keys.

i. Landlord hereby reserves the right to enter into (or cause its affiliate to enter into) a management agreement or lease with an entity for all or any portion of the Parking Facility (a “**Parking Facility Operator**”). In such event, Tenant, upon request of Landlord, shall enter into a parking agreement with such Parking Facility Operator, provided that such agreement is on reasonable terms, does not conflict with the terms of the Lease, as amended from time to time, and that such agreement does not impose any additional cost or liability on Tenant. Any such parking lease or agreement entered into between Tenant and any Parking Facility Operator shall be freely assignable by such Parking Facility Operator or any successors thereto.

9. Surrender of Premises: Alterations. Notwithstanding anything to the contrary in Section 12 of the Lease (entitled "Alterations"), Section 36 of the Lease (entitled "Surrender of Premises," as amended by Section 20 of the First Amendment) or any other provision of the Lease, all of the alterations and improvements that exist in the Premises as of September 30, 2018 (including, without limitation, any alterations and improvements installed by any prior tenant of any portion of the Premises) may, at Tenant's option, remain in place at the expiration of the New Term (or any extended expiration date of the Lease). However, if the Lease is terminated prior to the scheduled expiration of the New Term as a result of an event of default by Tenant, the above modifications shall be inapplicable and the provisions of the Lease in effect immediately prior to the execution of this Amendment shall continue to apply with regard to Tenant's removal obligations as to those alterations and improvements that exist in the Premises as of the date of this Amendment.

Further, notwithstanding anything to the contrary in Section 12 of the Lease (entitled "Alterations") or in Section 36 of the Lease (entitled "Surrender of Premises," as amended by Section 20 of the First Amendment), as to the Renovation Alterations being constructed by Tenant pursuant to Paragraph 3 above, and any subsequent alterations performed in the Premises by Tenant (including, without limitation, in the Expansion Space or any First Offer Space, if applicable), Tenant shall only be required, at the expiration or earlier termination of the Lease, to remove those portions of the Renovation Alterations or subsequent alterations (and perform the restoration work required by such removal) that Landlord notified Tenant in writing, at the time Landlord approved the plans for the subject work, would be required to be removed at the expiration or earlier termination of the Lease.

For avoidance of doubt, the foregoing provisions are applicable to alterations and improvements in the Premises, but are inapplicable to Tenant's personal property (which includes, without limitation, any and all liquid nitrogen tanks, supplemental HVAC equipment, rooftop equipment and other equipment) all of which must be removed by Tenant from the Premises at the expiration or earlier termination of the Lease. For avoidance of doubt, at the expiration or earlier termination of the Lease, the clean room may be left in its condition as-is condition as of the date of this Amendment and Tenant shall *not* be required to remove from the clean room the safety showers, plumbing and electrical installations or change rooms, or supplemental HVAC equipment located therein (if any).

10. Subordination. Notwithstanding anything to the contrary in Section 16 of the Lease, Landlord shall use commercially reasonable efforts to obtain from the holder of any existing mortgage or deed of trust which exists upon any portion of the Premises as of the date of this Amendment ("**Current Lender**"), not later than sixty (60) days following the execution and delivery of this Amendment by the parties, a non-disturbance agreement providing that if Tenant is not in default under the Lease (as amended by this Amendment) beyond any applicable grace period, Current Lender will recognize this Lease and Tenant's rights hereunder and will not disturb Tenant's possession or rights hereunder, and if this Lease is by operation of law terminated in a foreclosure, that a new lease will be entered into on the same terms as this Lease for the remaining term hereof, and including such further matters and conditions to the foregoing as may be customarily and commercially reasonably required by Current Lender. Any and all charges imposed by Current Lender due to Tenant requesting revisions to Current Lender's form agreement shall be borne by Tenant. The failure of Current Lender to execute and deliver to Tenant the aforementioned non-disturbance agreement shall not constitute a breach of the Lease by Landlord or entitle Tenant to terminate this Amendment, it being acknowledged that Landlord's sole obligation is to use commercially reasonable efforts to obtain the non-disturbance agreement from Current Lender.

11. Holdover. Effective as of the date hereof, the second sentence of Section 25 of the Lease is modified to provide that the holdover rate for Base Rent is one hundred fifty percent (150%) of the Base Rent rate that was in effect as of the expiration or earlier termination of the Lease.

12. Security Deposit. In accordance with Section 19 of the Lease, Landlord presently holds a cash Security Deposit in the amount of Seventy Thousand Five Hundred Eighty Dollars (\$70,580.00). The Security Deposit shall remain in effect throughout the New Term, subject to the terms of Paragraph 19 of the Lease.

13. Compliance with Law.

a. Landlord's Representation. Landlord represents and warrants to Tenant that, to the best of Landlord's knowledge (which, for purposes hereof, shall be limited to the actual knowledge, without inquiry, of the Building manager for the Building as of the date of this Amendment), Landlord has not received any written notice from any governmental body that the common areas of the Project are in violation of any applicable legal requirements with which the common areas must comply in order for Tenant to legally occupy the Premises and to legally use the common areas that are within Tenant's expected path of travel.

b. Hazardous Materials. Without limitation of any other provision of the Lease, the provisions of Section 4.D. of the Lease (entitled "Hazardous Materials"), as amended by Section 11 of the First Amendment and Section 14 of the Second Amendment, shall continue to apply throughout the New Term and any further extension of the Lease term.

14. Continuing Guaranty of Lease. Tenant's obligations under the Lease (as amended hereby) are guaranteed by Form Factor, Inc., a Delaware corporation ("**Guarantor**") pursuant to a continuing guaranty of lease executed by Guarantor in favor of Landlord in the form of attached Exhibit B (the "**Guaranty**") and dated concurrently herewith. Tenant has advised Landlord that, in the future, Tenant may assign the Lease to Guarantor. In such event, the Guaranty shall be terminated as to obligations arising under the Lease from and after such assignment.

15. Separation of Buildings. In the event Landlord desires to separate the leasehold interests under the Lease so that a separate lease is created for each of, or some of, the Buildings in which the Premises are located, Landlord may so separate the leasehold interests by creating a separate lease for the subject Buildings, provided that such separation of the leasehold interest does not diminish in any manner Tenant's rights under this Lease or increase Tenant obligations under the Lease (other than minor increases in Tenant's administrative obligations, such as delivering notices, or paying rent, to more than one landlord entity). If Landlord elects to so separate the leasehold interests so that separate leases covers each of (or some of the Buildings), as provided in this Paragraph 15, Tenant shall, at Landlord's sole but reasonable cost and expense, execute the documentation reasonably required to cause such separation of the leasehold interests so that the Premises are properly covered by the relevant Building(s), subject to the requirements of the immediately preceding sentence regarding the protection of Tenant's rights and interests.

16. Real Estate Brokers. Tenant represents and warrants that it has negotiated this Amendment directly with Shorenstein Realty Services, LP, representing Landlord, and Newmark Knight Frank and Colliers, representing Tenant (the "**Brokers**") and has not authorized or employed, or acted by implication to authorize or to employ, any other real estate broker or salesman to act for Tenant in connection with this Amendment. Tenant shall indemnify, defend and hold Landlord harmless from and against any and all claims by any real estate broker or salesman other than the Brokers for a commission, finder's fee or other compensation as a result of the inaccuracy of Tenant's foregoing representation. Pursuant to separate written agreements, Landlord shall pay the commission due to Brokers on account of this Amendment and Tenant shall have no responsibility therefor.

The parties acknowledge that no commissions are due to either of the Brokers on account of this Amendment unless and until Tenant's right to terminate this Amendment pursuant to Paragraph 4.d. above is no longer of any force or effect, either due to (x) the Amendment Termination Option not being triggered under Paragraph 4.d. above, or (y) if the Amendment Termination Option is triggered under Paragraph 4.d. above, Tenant's failure to exercise the Amendment Termination Option on or before August 31, 2018, or Tenant's earlier delivery to Landlord of Tenant's written waiver of Tenant's right to exercise the Amendment Termination Option.

17. Authority. If Tenant is a corporation, partnership, trust, association or other entity, Tenant and each person executing this Amendment on behalf of Tenant hereby covenants and warrants that (a) Tenant is duly incorporated or otherwise established or formed and validly existing under the laws of its state of incorporation, establishment or formation, (b) Tenant has and is duly qualified to do business in the state of Oregon, (c) Tenant has full corporate, partnership, trust, association or other appropriate power and authority to enter into this Amendment and to perform all Tenant's obligations under the Lease, as amended by this Amendment, and (d) each person (and all of the persons if more than one signs) signing this Amendment on behalf of Tenant is duly and validly authorized to do so.

18. No Offer. Submission of this instrument for examination and signature by Tenant does not constitute an offer to extend the lease or to amend the Lease, or a reservation of or option to extend the lease or to amend the Lease, and is not effective as a lease amendment or otherwise until execution and delivery by both Landlord and Tenant.

19. Lease in Full Force and Effect. Except as provided above, the Lease is unmodified hereby and remains in full force and effect.

20. Counterparts. This Amendment may be executed in counterparts, which together shall constitute one agreement.

(continued on next page)

IN WITNESS WHEREOF, the parties have executed this document as of the date and year first above written.

Landlord:

Tenant:

NIMBUS CENTER LLC, a Delaware limited liability company	FORMFACTOR BEAVERTON, INC., an Oregon corporation
By: <u>[Signature]</u>	By: <u>[Signature]</u>
Name: <u>Jed Brush</u>	Name: <u>SHAI SHAHAR</u>
Title: <u>Vice President</u>	Title: <u>CFO</u>

EXHIBITS

Exhibit A – Appraisal Procedure

Exhibit B – Form of Continuing Guaranty of Lease

## EXHIBIT A

### Appraisal Procedure

Within fifteen (15) days after the expiration of the thirty (30)-day period referenced in the last sentence of Paragraph 6.c. in the Amendment above for the mutual agreement of Landlord and Tenant as to the Prevailing Market rent, each party hereto, at its cost, shall engage a real estate broker to act on its behalf in determining the Prevailing Market rent. The brokers each shall have at least ten (10) years' experience with leases in first-class office buildings in the Beaverton, Oregon/Highway 217 submarket and shall submit to Landlord and Tenant in advance for Landlord's and Tenant's reasonable approval the appraisal methods to be used. If a party does not appoint a broker within said fifteen (15)-day period but a broker is appointed by the other respective party, the single broker appointed shall be the sole broker and shall set the Prevailing Market rent. If the two brokers are appointed by the parties as stated in this paragraph, such brokers shall meet promptly and attempt to set the Prevailing Market rent. If such brokers are unable to agree within thirty (30) days after appointment of the second broker, the brokers shall elect a third broker meeting the qualifications stated in this paragraph within ten (10) days after the last date the two brokers are given to set the Prevailing Market rent. Each of the parties hereto shall bear one-half (1/2) the cost of appointing the third broker and of the third broker's fee. The third broker shall be a person who has not previously acted in any capacity for either party.

The third broker shall conduct his own investigation of the Prevailing Market rent, and shall be instructed not to advise either party of his determination of the Prevailing Market rent except as follows: When the third broker has made his determination, he shall so advise Landlord and Tenant and shall establish a date, at least five (5) days after the giving of notice by the third broker to Landlord and Tenant, on which he shall disclose his determination of the Prevailing Market rent. Such meeting shall take place in the third broker's office unless otherwise agreed by the parties. After having initialed a paper on which his determination of Prevailing Market rent is set forth, the third broker shall place his determination of the Prevailing Market rent in a sealed envelope. Landlord's broker and Tenant's broker shall each set forth their determination of Prevailing Market rent on a paper, initial the same and place them in sealed envelopes. Each of the three envelopes shall be marked with the name of the party whose determination is inside the envelope.

In the presence of the third broker, the determination of the Prevailing Market rent by Landlord's broker and Tenant's broker shall be opened and examined. If the higher of the two determinations is 105% or less of the amount set forth in the lower determination, the average of the two determinations shall be the Prevailing Market rent, the envelope containing the determination of the Prevailing Market rent by the third broker shall be destroyed and the third broker shall be instructed not to disclose his determination. If either party's envelope is blank, or does not set forth a determination of Prevailing Market rent, the determination of the other party shall prevail and be treated as the Prevailing Market rent. If the higher of the two determinations is more than 105% of the amount of the lower determination, the envelope containing the third broker's determination shall be opened. If the value determined by the third broker is the average of the values proposed by Landlord's broker and Tenant's broker, the third broker's determination of Prevailing Market rent shall be the Prevailing Market rent. If such is not the case, Prevailing Market rent shall be the rent proposed by either Landlord's broker or Tenant's broker which is closest to the determination of Prevailing Market rent by the third broker.

EXHIBIT B

Form of Continuing Guaranty of Lease

**(see attached document)**

## GUARANTY OF LEASE

THIS GUARANTY OF LEASE is executed by FORMFACTOR, INC., a Delaware corporation ("Guarantor"), in favor of NIMBUS CENTER LLC, a Delaware limited liability company ("Landlord").

### RECITALS

A. FORMFACTOR BEAVERTON, INC., an Oregon corporation (formerly known as Cascade Microtech) ("Tenant", which terms shall include its successors and assigns), as tenant, and Landlord, as landlord, are parties to that certain lease dated as of April 2, 1999, as amended by a First Amendment dated as of January 10, 2007, Second Amendment to Lease dated as of February 25, 2013, Third Amendment to Lease dated as of January 23, 2014, Fourth Amendment to Lease dated as of March 31, 2014, Fifth Amendment to Lease dated as of September 24, 2014, Sixth Amendment to Lease dated as of July 8, 2015, and Seventh Amendment to Lease dated concurrently herewith. The aforementioned lease, as so amended, and as may be amended or otherwise modified from time to time, is referred to hereinafter as the "Lease." As of the date hereof, the Lease covers premises totaling approximately 98,946 rentable square feet of space (the "Premises") and located in the four (4) buildings having the addresses, respectively, of 9100, 9500, 9203 and 9000 SW Gemini in Beavertown, Oregon. The Premises are located in the office project commonly known as Nimbus Center.

B. As a condition to the execution of the Seventh Amendment to Lease referenced above, Landlord is requiring Guarantor to guarantee Tenant's obligations under the Lease. Guarantor will derive substantial benefit from the Lease by virtue of Guarantor's relationship with Tenant.

NOW, THEREFORE, as a material inducement to Landlord's agreement to enter into the Lease, Guarantor agrees as follows:

1. Guaranty. Guarantor hereby irrevocably and unconditionally guarantees to Landlord the prompt, full and complete performance of all of the obligations of Tenant under the Lease as and when due, including, without limitation, any obligations existing under the Lease as of the date of this Guaranty. If Tenant at any time fails to make any payment under the Lease when due or fails to perform or comply with any covenant, condition or term of the Lease, Guarantor will, upon written notice from Landlord and without further demand, pay, perform or comply with the same in the same manner and to the same extent as is required of Tenant.

2. Covenants and Acknowledgments.

(a) Guarantor agrees that, regardless of whether Landlord gives notice thereof or obtains the consent of Guarantor thereto, Guarantor's liability hereunder shall not be released, extinguished or otherwise reduced in any way by reason of:

(i) Any amendment, modification, renewal, extension, substitution or replacement of the Lease or any of the guaranteed obligations, in whole or in part;

(ii) Any acceptance, enforcement or release by Landlord of any security for the Lease or any of the guaranteed obligations, any addition, substitution or release of any guarantor, or any enforcement, waiver, surrender, impairment, release, compromise or settlement of any matter with respect to the Lease or any of the guaranteed obligations or any security therefor;

(iii) Any assignment of this Guaranty in whole or in part by Landlord, or any assignment or transfer of the Lease by Landlord or Tenant, or any sublease by Tenant of the Premises;

(iv) The invalidity or unenforceability of any provision of the Lease or any of the guaranteed obligations (unless such invalid or unenforceable Lease provision or guaranteed obligation (A) is the specific Lease provision or guaranteed obligation as to which Landlord is seeking Guarantor's performance, and (B) is invalid or unenforceable generally, rather than invalid or unenforceable specifically against Tenant only); or

(v) Any failure, omission or delay of Landlord in enforcing the Lease, any of the guaranteed obligations, or this Guaranty, any refund of payments received by Landlord with respect to any of the guaranteed obligations, or any other action which Landlord may take or omit to take in connection with the Lease, any of the guaranteed obligations, or this Guaranty, unless the subject acts or omissions by Landlord modified Tenant's obligations under the Lease, in which event Guarantor's obligations hereunder shall be concurrently modified.

(b) Landlord has no duty to disclose to Guarantor any information it receives regarding the financial status of Tenant, whether or not such information indicates that the risk of Guarantor under this Guaranty has been or may be increased. Guarantor assumes full responsibility for being and keeping

informed of Tenant's financial condition, Tenant's performance under the Lease, and Tenant's use and operation of the Premises.

(c) Guarantor hereby subordinates all its claims for payment or liens securing indebtedness of Tenant to Guarantor, if any, to Landlord's right to receive payment from Tenant of all sums due under the Lease.

(d) The obligations of Guarantor under this Guaranty are primary and are independent of the obligations of Tenant, and Landlord may directly enforce its rights under this Guaranty without proceeding against or joining Tenant or any other person or entity, or applying or enforcing any security for the Lease.

(e) Guarantor's obligations hereunder shall not be affected by any bankruptcy, insolvency, or reorganization of Tenant, by any disaffirmance or abandonment by a trustee of Tenant, or any termination, rejection, modification of the Lease or any of the guaranteed obligations in connection with the bankruptcy, insolvency or reorganization of Tenant. If any payments made to Landlord by Tenant or any other guarantor of the Lease are deemed to be a fraudulent, preferential or voidable transfer, then Guarantor's liability hereunder shall automatically be revived, reinstated and restored as to the amount of any such transfer plus all costs and expenses (including court costs and attorneys' fees) of Landlord related thereto.

(f) For avoidance of doubt, Guarantor's obligations hereunder shall not exceed Tenant's obligations under the Lease, except to the extent Tenant's obligations under the Lease are limited due to a legal disability particular to Tenant (including, without limitation, insolvency or bankruptcy of Tenant). Further, notwithstanding anything to the contrary in this Guaranty, Landlord shall not demand payment or compliance by Guarantor hereunder until Landlord has demanded such payment or compliance in writing directly to Tenant, which written demand may be satisfied by Landlord delivering written notice to Tenant under the notice provisions of the Lease to the last notice address provided by Tenant to Landlord under the notice provisions of the Lease. Landlord shall not be required to deliver repeated notices to Tenant for any particular breach of the Lease by Tenant in order for Landlord to make a demand against Guarantor hereunder and shall have satisfied the foregoing notice requirement after delivering the first written notice to Tenant advising Tenant of the particular breach at issue.

3. Waivers. Guarantor waives (a) any right to the benefit of, or to direct the application of, any security held by Landlord, (b) any right to require Landlord to proceed against Tenant or any other person or entity for enforcement of the Lease or the guaranteed obligations, (c) any defense arising out of any amendment of the Lease or the guaranteed obligations (except that Guarantor's obligations under this Guaranty shall be limited to the terms of the Lease and the guaranteed obligations, as so amended), (d) any right of subrogation to any rights of Landlord, and any right of reimbursement, indemnity or contribution against any person or entity with direct or contingent liability for any of the guaranteed obligations, (e) any defense to Landlord's recovery of any deficiency after Landlord has exercised any right or remedy, even if such exercise results in any impairment of Guarantor's rights of reimbursement or subrogation or any other rights of Guarantor against Tenant, (f) any defense arising out of the absence, impairment or loss of any right of reimbursement or subrogation or other right or remedy of Guarantor against Tenant or any security held by Landlord, (g) any defense arising by reason of any legal disability or other defense of Tenant to the enforcement of this Guaranty, or the cessation or reduction of the liability of Tenant from any cause whatsoever other than full payment, performance and discharge of the obligations under the Lease, except that the waiver in this item (g) shall be inapplicable with regard to an invalid or unenforceable provision of the Lease that (A) is the specific provision or guaranteed obligation as to which Landlord is seeking Guarantor's performance, and (B) is invalid or unenforceable generally, rather than invalid or unenforceable specifically against Tenant due to a legal disability particular to Tenant (including, without limitation, insolvency or bankruptcy of Tenant), (h) notice of acceptance of this Guaranty, (i) notice of Tenant's default in the payment or performance of any of the guaranteed obligations, and (j) presentment, demand, protest and notice of any other kind.

4 Miscellaneous.

(a) This Guaranty shall inure to the benefit of any person or entity who at any time may be entitled to the benefits of, or obligated to perform the duties of, Landlord under the Lease, and shall be binding upon the, heirs, administrators, successors and permitted assigns of Guarantor.

(b) Guarantor may not assign its obligations under this Guaranty to any other person or entity without the written consent of Landlord, which Landlord may withhold in its sole and absolute discretion.

(c) If legal action is brought hereunder, the losing party shall pay on demand to the prevailing party all costs and expenses, including court costs and attorneys' fees, incurred or paid by the

prevailing party in such action, together with interest on all such amounts at the maximum interest rate allowed by law.

(d) This Guaranty may not be changed orally, and no obligation of Guarantor can be released or waived except by a writing signed by Landlord.

(e) No failure by Landlord to declare a default under this Guaranty upon its occurrence, nor any delay by Landlord in taking action for a default under this Guaranty, shall constitute a waiver of the default or Landlord's rights and remedies in connection therewith, nor shall it constitute an estoppel.

(f) If any term or provision of this Guaranty is ever determined to be illegal or unenforceable, all other terms and provisions of this Guaranty shall remain effective and enforceable to the fullest extent permitted by law.

(g) This Guaranty and the rights and obligations of Guarantor and Landlord under this Guaranty shall be governed by and construed in accordance with the laws of the State of Oregon, and the venue of any action or proceeding under this Guaranty shall be the City of Portland and County of Multnomah, Oregon. Guarantor hereby submits to personal jurisdiction in the State of Oregon for the enforcement of this Guaranty, waives any and all personal rights under the laws of the State of Oregon to object to jurisdiction within that state for the purposes of any action or proceeding to enforce this Guaranty, and agrees that service of process may be made, and personal jurisdiction over Guarantor obtained, by service of process upon Guarantor at the address set forth below or by any other means of obtaining personal jurisdiction and perfecting service of process as now or hereafter provided by the laws of the State of Oregon.

(h) IF ANY ACTION OR PROCEEDING BETWEEN LANDLORD AND GUARANTOR TO ENFORCE THE PROVISIONS OF THIS GUARANTY PROCEEDS TO TRIAL, LANDLORD AND GUARANTOR HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO A JURY IN SUCH TRIAL. Landlord and Guarantor agree that this paragraph constitutes a written consent to waiver of trial by jury, and Guarantor does hereby authorize and empower Landlord to file this paragraph and or Guaranty, as required, with the clerk or judge of any court of competent jurisdiction as a written consent to waiver of jury trial.

(i) Any notices to be sent by either party hereto to the other party shall be in writing and delivered personally, sent by reputable overnight or same-day courier, or sent by United States certified or registered mail, postage prepaid, and addressed, if the notice is from Guarantor to Landlord, to Landlord in care of Shorenstein Company LLC, 235 Montgomery Street, 16<sup>th</sup> Floor, Attn: Corporate Secretary, San Francisco, CA 94104, and if the notice is from Landlord to Guarantor, to Guarantor at the address set forth below Guarantor's signature at the end of this Guaranty. Either party may change the address to which notice to such party shall be sent hereunder by providing the other party with notice of such address in accordance with the provisions of this paragraph.

IN WITNESS WHEREOF, this Guaranty is dated and has been executed by Guarantor effective as of June 5, 2018.

Guarantor:

FORM FACTOR, INC.,  
a Delaware corporation

Address:

4005 Southfront Road  
Livermore, CA 94551

By EXHIBIT ONLY – DO NOT SIGN

Name \_\_\_\_\_

Title \_\_\_\_\_

## GUARANTY OF LEASE

THIS GUARANTY OF LEASE is executed by FORMFACTOR, INC., a Delaware corporation ("**Guarantor**"), in favor of NIMBUS CENTER LLC, a Delaware limited liability company ("**Landlord**").

### RECITALS

A. FORMFACTOR BEAVERTON, INC., an Oregon corporation (formerly known as Cascade Microtech) ("**Tenant**", which terms shall include its successors and assigns), as tenant, and Landlord, as landlord, are parties to that certain lease dated as of April 2, 1999, as amended by a First Amendment dated as of January 10, 2007, Second Amendment to Lease dated as of February 25, 2013, Third Amendment to Lease dated as of January 23, 2014, Fourth Amendment to Lease dated as of March 31, 2014, Fifth Amendment to Lease dated as of September 24, 2014, Sixth Amendment to Lease dated as of July 8, 2015, and Seventh Amendment to Lease dated concurrently herewith. The aforementioned lease, as so amended, and as may be amended or otherwise modified from time to time, is referred to hereinafter as the "**Lease**." As of the date hereof, the Lease covers premises totaling approximately 98,946 rentable square feet of space (the "**Premises**") and located in the four (4) buildings having the addresses, respectively, of 9100, 9500, 9203 and 9000 SW Gemini in Beavertown, Oregon. The Premises are located in the office project commonly known as Nimbus Center.

B. As a condition to the execution of the Seventh Amendment to Lease referenced above, Landlord is requiring Guarantor to guarantee Tenant's obligations under the Lease. Guarantor will derive substantial benefit from the Lease by virtue of Guarantor's relationship with Tenant.

NOW, THEREFORE, as a material inducement to Landlord's agreement to enter into the Lease, Guarantor agrees as follows:

1. Guaranty. Guarantor hereby irrevocably and unconditionally guarantees to Landlord the prompt, full and complete performance of all of the obligations of Tenant under the Lease as and when due, including, without limitation, any obligations existing under the Lease as of the date of this Guaranty. If Tenant at any time fails to make any payment under the Lease when due or fails to perform or comply with any covenant, condition or term of the Lease, Guarantor will, upon written notice from Landlord and without further demand, pay, perform or comply with the same in the same manner and to the same extent as is required of Tenant.

2. Covenants and Acknowledgments.

(a) Guarantor agrees that, regardless of whether Landlord gives notice thereof or obtains the consent of Guarantor thereto, Guarantor's liability hereunder shall not be released, extinguished or otherwise reduced in any way by reason of:

(i) Any amendment, modification, renewal, extension, substitution or replacement of the Lease or any of the guaranteed obligations, in whole or in part;

(ii) Any acceptance, enforcement or release by Landlord of any security for the Lease or any of the guaranteed obligations, any addition, substitution or release of any guarantor, or any enforcement, waiver, surrender, impairment, release, compromise or settlement of any matter with respect to the Lease or any of the guaranteed obligations or any security therefor;

(iii) Any assignment of this Guaranty in whole or in part by Landlord, or any assignment or transfer of the Lease by Landlord or Tenant, or any sublease by Tenant of the Premises;

(iv) The invalidity or unenforceability of any provision of the Lease or any of the guaranteed obligations (unless such invalid or unenforceable Lease provision or guaranteed obligation (A) is the specific Lease provision or guaranteed obligation as to which Landlord is seeking Guarantor's performance, and (B) is invalid or unenforceable generally, rather than invalid or unenforceable specifically against Tenant only); or

(v) Any failure, omission or delay of Landlord in enforcing the Lease, any of the guaranteed obligations, or this Guaranty, any refund of payments received by Landlord with respect to any of the guaranteed obligations, or any other action which Landlord may take or omit to take in connection with the Lease, any of the guaranteed obligations, or this Guaranty, unless the subject acts or omissions by Landlord modified Tenant's obligations under the Lease, in which event Guarantor's obligations hereunder shall be concurrently modified.

(b) Landlord has no duty to disclose to Guarantor any information it receives regarding the financial status of Tenant, whether or not such information indicates that the risk of Guarantor under this Guaranty has been or may be increased. Guarantor assumes full responsibility for being and keeping

informed of Tenant's financial condition, Tenant's performance under the Lease, and Tenant's use and operation of the Premises.

(c) Guarantor hereby subordinates all its claims for payment or liens securing indebtedness of Tenant to Guarantor, if any, to Landlord's right to receive payment from Tenant of all sums due under the Lease.

(d) The obligations of Guarantor under this Guaranty are primary and are independent of the obligations of Tenant, and Landlord may directly enforce its rights under this Guaranty without proceeding against or joining Tenant or any other person or entity, or applying or enforcing any security for the Lease.

(e) Guarantor's obligations hereunder shall not be affected by any bankruptcy, insolvency, or reorganization of Tenant, by any disaffirmance or abandonment by a trustee of Tenant, or any termination, rejection, modification of the Lease or any of the guaranteed obligations in connection with the bankruptcy, insolvency or reorganization of Tenant. If any payments made to Landlord by Tenant or any other guarantor of the Lease are deemed to be a fraudulent, preferential or voidable transfer, then Guarantor's liability hereunder shall automatically be revived, reinstated and restored as to the amount of any such transfer plus all costs and expenses (including court costs and attorneys' fees) of Landlord related thereto.

(f) For avoidance of doubt, Guarantor's obligations hereunder shall not exceed Tenant's obligations under the Lease, except to the extent Tenant's obligations under the Lease are limited due to a legal disability particular to Tenant (including, without limitation, insolvency or bankruptcy of Tenant). Further, notwithstanding anything to the contrary in this Guaranty, Landlord shall not demand payment or compliance by Guarantor hereunder until Landlord has demanded such payment or compliance in writing directly to Tenant, which written demand may be satisfied by Landlord delivering written notice to Tenant under the notice provisions of the Lease to the last notice address provided by Tenant to Landlord under the notice provisions of the Lease. Landlord shall not be required to deliver repeated notices to Tenant for any particular breach of the Lease by Tenant in order for Landlord to make a demand against Guarantor hereunder and shall have satisfied the foregoing notice requirement after delivering the first written notice to Tenant advising Tenant of the particular breach at issue.

3. Waivers. Guarantor waives (a) any right to the benefit of, or to direct the application of, any security held by Landlord, (b) any right to require Landlord to proceed against Tenant or any other person or entity for enforcement of the Lease or the guaranteed obligations, (c) any defense arising out of any amendment of the Lease or the guaranteed obligations (except that Guarantor's obligations under this Guaranty shall be limited to the terms of the Lease and the guaranteed obligations, as so amended), (d) any right of subrogation to any rights of Landlord, and any right of reimbursement, indemnity or contribution against any person or entity with direct or contingent liability for any of the guaranteed obligations, (e) any defense to Landlord's recovery of any deficiency after Landlord has exercised any right or remedy, even if such exercise results in any impairment of Guarantor's rights of reimbursement or subrogation or any other rights of Guarantor against Tenant, (f) any defense arising out of the absence, impairment or loss of any right of reimbursement or subrogation or other right or remedy of Guarantor against Tenant or any security held by Landlord, (g) any defense arising by reason of any legal disability or other defense of Tenant to the enforcement of this Guaranty, or the cessation or reduction of the liability of Tenant from any cause whatsoever other than full payment, performance and discharge of the obligations under the Lease, except that the waiver in this item (g) shall be inapplicable with regard to an invalid or unenforceable provision of the Lease that (A) is the specific provision or guaranteed obligation as to which Landlord is seeking Guarantor's performance, and (B) is invalid or unenforceable generally, rather than invalid or unenforceable specifically against Tenant due to a legal disability particular to Tenant (including, without limitation, insolvency or bankruptcy of Tenant), (h) notice of acceptance of this Guaranty, (i) notice of Tenant's default in the payment or performance of any of the guaranteed obligations, and (j) presentment, demand, protest and notice of any other kind.

#### 4 Miscellaneous.

(a) This Guaranty shall inure to the benefit of any person or entity who at any time may be entitled to the benefits of, or obligated to perform the duties of, Landlord under the Lease, and shall be binding upon the, heirs, administrators, successors and permitted assigns of Guarantor.

(b) Guarantor may not assign its obligations under this Guaranty to any other person or entity without the written consent of Landlord, which Landlord may withhold in its sole and absolute discretion.

(c) If legal action is brought hereunder, the losing party shall pay on demand to the prevailing party all costs and expenses, including court costs and attorneys' fees, incurred or paid by the

prevailing party in such action, together with interest on all such amounts at the maximum interest rate allowed by law.

(d) This Guaranty may not be changed orally, and no obligation of Guarantor can be released or waived except by a writing signed by Landlord.

(e) No failure by Landlord to declare a default under this Guaranty upon its occurrence, nor any delay by Landlord in taking action for a default under this Guaranty, shall constitute a waiver of the default or Landlord's rights and remedies in connection therewith, nor shall it constitute an estoppel.

(f) If any term or provision of this Guaranty is ever determined to be illegal or unenforceable, all other terms and provisions of this Guaranty shall remain effective and enforceable to the fullest extent permitted by law.

(g) This Guaranty and the rights and obligations of Guarantor and Landlord under this Guaranty shall be governed by and construed in accordance with the laws of the State of Oregon, and the venue of any action or proceeding under this Guaranty shall be the City of Portland and County of Multnomah, Oregon. Guarantor hereby submits to personal jurisdiction in the State of Oregon for the enforcement of this Guaranty, waives any and all personal rights under the laws of the State of Oregon to object to jurisdiction within that state for the purposes of any action or proceeding to enforce this Guaranty, and agrees that service of process may be made, and personal jurisdiction over Guarantor obtained, by service of process upon Guarantor at the address set forth below or by any other means of obtaining personal jurisdiction and perfecting service of process as now or hereafter provided by the laws of the State of Oregon.

(h) IF ANY ACTION OR PROCEEDING BETWEEN LANDLORD AND GUARANTOR TO ENFORCE THE PROVISIONS OF THIS GUARANTY PROCEEDS TO TRIAL, LANDLORD AND GUARANTOR HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO A JURY IN SUCH TRIAL. Landlord and Guarantor agree that this paragraph constitutes a written consent to waiver of trial by jury, and Guarantor does hereby authorize and empower Landlord to file this paragraph and or Guaranty, as required, with the clerk or judge of any court of competent jurisdiction as a written consent to waiver of jury trial.

(i) Any notices to be sent by either party hereto to the other party shall be in writing and delivered personally, sent by reputable overnight or same-day courier, or sent by United States certified or registered mail, postage prepaid, and addressed, if the notice is from Guarantor to Landlord, to Landlord in care of Shorenstein Company LLC, 235 Montgomery Street, 16<sup>th</sup> Floor, Attn: Corporate Secretary, San Francisco, CA 94104, and if the notice is from Landlord to Guarantor, to Guarantor at the address set forth below Guarantor's signature at the end of this Guaranty. Either party may change the address to which notice to such party shall be sent hereunder by providing the other party with notice of such address in accordance with the provisions of this paragraph.

IN WITNESS WHEREOF, this Guaranty is dated and has been executed by Guarantor effective as of June 5, 2018.

Guarantor:

Address:

FORM FACTOR, INC.,  
a Delaware corporation

 4005 Southfront Road  
Livermore, CA 94551

By  \_\_\_\_\_

Name SHAI SHAHAR

Title CFO

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**EIGHTH AMENDMENT TO LEASE**  
(Adding Additional Premises and Partial Surrender)

THIS EIGHTH AMENDMENT TO Lease (“Amendment”) is executed as of the 14 day of December, ~~2021~~<sup>2022</sup>, between G&I X NIMBUS CORPORATE CENTER LLC, a Delaware limited liability company (“Landlord”) and FORMFACTOR, INC., a Delaware corporation (“Tenant”).

**RECITALS**

A. Landlord (as successor-in-interest to Nimbus Center LLC, as successor in interest to OR-Nimbus Corporate Center, L.L.C., and, prior thereto, Spieker Properties, L.P., a California limited partnership) and Tenant (formerly known as Cascade Microtech, Inc.) are parties to that certain lease dated as of April 2, 1999 (the “Original Lease”), as amended by First Amendment dated as of January 10, 2007 (the “First Amendment”), Second Amendment to Lease dated as of February 25, 2013 (the “Second Amendment”), Third Amendment to Lease dated as of January 23, 2014 (the “Third Amendment”), Fourth Amendment to Lease dated as of March 31, 2014 (the “Fourth Amendment”), Fifth Amendment to Lease dated as of September 24, 2014 (the “Fifth Amendment”), Sixth Amendment to Lease dated as of July 8, 2015 (the “Sixth Amendment”), and Seventh Amendment to Lease dated as of June 5, 2018 (the “Seventh Amendment”) (the Original Lease, as amended by such amendments, being referred to hereinafter as the “Lease”) pursuant to which Tenant presently leases from Landlord the following premises:

- i. 58,817 rentable square feet of space (the “Building 6 Premises”) comprising all of the rentable area of the building located at 9100 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 6 (“Building 6”),
- ii. 17,293 rentable square feet of space (the “Building 3 Premises”) in the building located at 9500 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 3 (“Building 3”) (which Building 3 Premises is comprised of 12,173 RSF in Suite 9500 and 5,120 RSF in Suite I00A),
- iii. 14,348 rentable square feet of space (the “Building 9 Premises”) in the building located at 9203 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 9 (“Building 9”) (which Building 9 Premises is comprised of 1,602 RSF in Suite 9203B, 3,634 RSF in Suite 9205, 6,799 RSF in Suite 9215 and 2,313 RSF in Suite 9225), and
- iv. 8,488 rentable square feet of space (the “Building 8 Premises”) in the building located at 9000 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 8 (“Building 8”) (which Building 8 Premises is comprised of Suites 9090 and Suite 9040).

The Building 6 Premises, the Building 3 Premises, the Building 9 Premises and the Building 8 Premises are referred to herein collectively as the “Premises” and constitute all of the space covered by the Lease as of the date of this Amendment. Building 6, Building 3, Building 9 and Building 8 are sometimes referred to individually in this Amendment as a “Building”. The parties agree that, for all purposes of the Lease, the total rentable square footage of the Lease is deemed to be 98,946 rentable square feet of space. All capitalized terms not otherwise defined herein shall have the meaning given them in the Lease. The present expiration date of the Lease with respect to the Premises is December 31, 2027.

B. Landlord and Tenant presently desire to amend the Lease to (i) modify the termination date for the Building 3 Premises upon the terms set forth in this Amendment, (ii) expand the Premises to include additional space on the first (1<sup>st</sup>) floor of the building located at 9400 SW Gemini Drive, Beaverton, Oregon, and commonly known as Nimbus Building 4 (“**Building 4**”), (iii) modification of Base Rent payable under the Lease, (iv) modification of Tenant’s Proportionate Share of the Project, and (v) document certain other modifications to the Lease agreed to by Landlord and Tenant, all as more fully provided below.

NOW, THEREFORE, in consideration of the foregoing, the parties hereby agree as follows:

1. **Building 4 Premises.** Commencing on the Building 4 Premises Commencement Date (as defined below), and ending on the Expiration Date (as defined in the Seventh Amendment), the space on the first (1<sup>st</sup>) floor of Building 4 shown outlined on the attached Exhibit A and known as Suite 9400 (the “Building 4 Premises”) shall be added to the Premises covered by the Lease. Commencing on the last to occur of the Building 4 Premises Commencement Date and the Surrender Date (as defined in Paragraph 3 below), and continuing until the Expiration Date, all references in the Lease and in this Amendment to (i) the “Premises” shall be deemed to refer to the Premises (less the Building 3 Premises) and the Building 4 Premises, collectively, and (ii) all references in the Lease to a “Building” shall be deemed to refer to Building 6, Building 9, Building 8 and Building 4. Landlord and Tenant hereby stipulate for all purposes of the Lease that the rentable square footage of the Building 4 Premises is deemed to be 19,552 rentable square feet and that, following the occurrence of both the Building 4 Premises Commencement Date and the Surrender Date, the rentable square footage of the Premises will be 101,205 rentable square feet.

The “Building 4 Premises Commencement Date” shall mean the date which is the first to occur of the date on which: (i) Tenant commences business operations in the Building 4 Premises; and (ii) April 15, 2022. Landlord shall use commercially reasonable efforts to tender possession of the Building 4 Premises on the date two (2) business days following the date of this Amendment (the “Target Delivery Date”), but in no event later than January 15, 2022. Landlord acknowledges and agrees that delivery of the Building 4 Premises shall not constitute commencement of business operations unless and until the Building 4 Alterations (defined below) are substantially completed. If Landlord is unable to tender possession of the Building 4 Premises on the scheduled Target Delivery Date for any reason whatsoever, neither this Amendment nor the Lease shall be void or voidable, nor shall any such delay in delivery of possession of the Building 4 Premises operate to extend the Term with respect to the Building 4 Premises beyond the Expiration Date or amend Tenant's obligations hereunder or under the Lease. Upon either party's request after the Building 4 Premises Commencement Date, the parties shall execute a letter confirming the Building 4 Commencement Date.

2. **Base Rent for Building 4 Premises.** Notwithstanding anything to the contrary in the Lease, effective as of the Building 4 Premises Commencement Date, and continuing throughout the Expiration Date, the Base Rent for the Building 4 Premises (under Paragraph 6 of the Lease) and Tenant's obligation to pay Tenant's Proportionate Share of Operating Expenses for the Premises (under Paragraphs 6.B. and 7 of the Lease, with the definition of Project being as provided in Paragraph 4 of the First Amendment) shall be as set forth below, it being understood that the Base Rent rate for the Building 4 Premises reflects a weighted average of (i) per rentable square foot Base Rent for the first 17,293 rentable square feet of the Building 4 Premises equal to the scheduled Base Rent rate applicable to the Building 3 Premises for calendar years 2022 through 2027 as set forth in the Seventh Amendment, and (ii) per rentable square foot Base Rent for 2,259 rentable square feet of the Building

4 Premises equal to the current market Base Rent for new space in the Project as of the date of this Amendment for calendar year 2022 (which rate is \$19.00 per rentable square foot per annum) and three percent (3%) annual escalations for each calendar year thereafter:

a. Building 4 Premises (19,552 RSF).

i. Base Rent.

<u>Period</u>	<u>Annual Rate per RSF</u>	<u>Monthly Base Rent</u>
*BPCD through 12/31/22	\$16.13	\$26,281.15
1/1/23 through 12/31/23	\$16.62	\$27,079.52
1/1/24 through 12/31/24	\$17.12	\$27,894.19
1/1/25 through 12/31/25	\$17.63	\$28,725.15
1/1/26 through 12/31/26	\$18.16	\$29,588.69
1/1/27 through 12/31/27	\$18.70	\$30,468.53

\*For purposes of the above chart, "BPCD" refers to the Building 4 Premises Commencement Date.

ii. Operating Expenses. Tenant's Proportionate Share of the Project as to the Building 4 Premises shall be 2.8345% throughout the New Term (based on 19,552 RSF).

3. Surrender of Building 3 Premises.

a. Surrender Premises. From and after the Building 4 Premises Commencement Date, Tenant's occupancy of the Building 3 Premises shall continue on the basis of a month-to-month tenancy terminable by Tenant by not less than sixty (60) days' written notice given to Landlord; provided, however, the Surrender Date for the Building 3 Premises shall not occur sooner than the Building 4 Premises Commencement Date, and shall not occur later than December 31, 2022. On or before the Surrender Date, Tenant shall vacate the Building 3 Premises and surrender the same to Landlord vacant and broom clean, with all trade fixtures, furniture, office equipment, and other equipment and personal property removed therefrom, with no obligation for restoration as otherwise required by the Lease, including without limitation Paragraph 9 of the Seventh Amendment. Tenant acknowledges that time is of the essence with respect to Tenant's obligation to surrender the Surrender Premises to Landlord in the condition required herein. Tenant's failure to timely so surrender the Building 3 Premises shall constitute a breach of and a default under the Lease (after applicable notice and cure periods), and a holdover of the Building 3 Premises without Landlord's consent for purposes of Paragraph 25 of the Lease, as amended by Paragraph 11 of the Seventh Amendment.

b. Release. The date on which Tenant shall surrender the Building 3 Premises to Landlord in the condition required by this Paragraph 3 is referred to herein as the "Surrender Date." Effective as of the Surrender Date, the Building 3 Premises shall be deemed deleted from the Lease and Tenant shall be released from its obligations thereafter arising under the Lease with respect to the Building 3 Premises. Notwithstanding the foregoing, however, Tenant shall remain liable for its obligations with regard to the Building 3 Premises that arise prior to the Surrender Date, and Tenant's indemnification obligations under the Lease shall survive the deletion of the Building 3 Premises from the Lease with regard to any events which occur prior to the Surrender Date.

4. Building 4 Alterations. Landlord shall have no obligation to make or pay for any improvements or renovations in or to any portion of the Building 4 Premises as a result of Tenant's lease thereof for the balance of the New Term and Tenant accepts the Premises in its as-is condition. The parties acknowledge that Tenant intends to make certain alterations and improvements to the Building 4 Premises following the date hereof (the "Building 4 Alterations"). The construction of the Building 4 Alterations by Tenant shall be performed in accordance with Paragraph 12 of the Lease (as amended) and the provisions of this Paragraph 4, and shall be performed at Tenant's sole cost and expense. The general contractor selected by Tenant to construct the Building 4 Alterations, and reasonably approved by Landlord, is referred to hereinafter as "Tenant's Contractor." The subcontractors performing work on the Building 4 Alterations shall also be subject to Landlord's reasonable approval. The Building 4 Alterations shall be performed diligently and in a first-class workmanlike manner and in accordance with plans and specifications reasonably approved by Landlord, and shall comply with all legal requirements and Landlord's construction standards, procedures, conditions and requirements for the Building (including, without limitation, Landlord's requirements relating to insurance). Landlord acknowledges Tenant's anticipated Building 4 Alterations as reflected in Exhibit B attached hereto and incorporated herein, and Landlord reserves the right to review and approve Tenant's proposed permit set of construction drawings related to the same, which approval shall not be unreasonably withheld, conditioned or delayed.

5. Expansion Option; Amendment Termination Option. For the avoidance of doubt, the Expansion Option and Amendment Termination Option set forth in Paragraph 4 of the Seventh Amendment have expired by their terms, are deleted in their entirety, and are null, void and of no further force or effect.

6. Renewal Options. The Renewal Options set forth in Paragraph 5 of the Seventh Amendment shall apply to the Building 4 Premises.

7. Exterior Building Signage for Buildings 3 and 8. The exterior signage rights set forth in Paragraph 7 of the Seventh Amendment shall continue to apply from and after the Building 4 Premises Commencement Date, except that (i) all references in such Paragraph 7 to "Building 3" shall be deemed references to "Building 4" and Tenant may install an exterior sign on Building 4 in accordance with the terms of such Paragraph 7, and (ii) upon the Surrender Date, Tenant shall remove the exterior sign located on Building 3 in the manner required by Paragraph 7 of the Seventh Amendment as though the Surrender Date were the expiration date or sooner termination of the Lease, it being understood that Tenant may maintain its exterior sign on Building 3 until the Surrender Date, notwithstanding that the Building 4 Commencement Date may occur on or prior to the Surrender Date.

8. Parking. Effective as of the (i) Building 4 Premises Commencement Date, the parking rights set forth in Paragraph 8 of the Seventh Amendment shall apply to the Building 4 Premises at Building 4, and (ii) Surrender Date, Tenant shall have no further parking rights at Building 3.

9. Real Estate Brokers. Tenant represents and warrants that it has not authorized or employed, or acted by implication to authorize or to employ, any real estate broker or salesman to act for Tenant in connection with this Amendment. Tenant shall indemnify, defend and hold Landlord harmless from and against any and all claims by any real estate broker or salesman for a commission, finder's fee or other compensation as a result of the inaccuracy of Tenant's foregoing representation.

10. Authority. If Tenant is a corporation, partnership, trust, association or other entity, Tenant and each person executing this Amendment on behalf of Tenant hereby covenants and warrants that (a) Tenant is duly incorporated or otherwise established or formed and validly existing under the laws of its state of incorporation, establishment or formation, (b) Tenant has and is duly qualified to do business in the state of Oregon, (c) Tenant has full corporate, partnership, trust, association or other appropriate power and authority to enter into this Amendment and to perform all Tenant's obligations under the Lease, as amended by this Amendment, and (d) each person (and all of the persons if more than one signs) signing this Amendment on behalf of Tenant is duly and validly authorized to do so.

11. No Offer. Submission of this instrument for examination and signature by Tenant does not constitute an offer to extend the lease or to amend the Lease, or a reservation of or option to extend the lease or to amend the Lease, and is not effective as a lease amendment or otherwise until execution and delivery by both Landlord and Tenant.

12. Lease in Full Force and Effect. Except as provided above, the Lease is unmodified hereby and remains in full force and effect.

13. Counterparts; Electronic Copies. This Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Execution of this Amendment by the parties hereto may be evidenced by the transmission of electronic copies (including copies executed by .PDF or DocuSign), which shall have the same effect as an original.

14. Cancellation of Guaranty. FORMFACTOR BEAVERTON, INC. ("FFBI"), has terminated its operations and dissolved the corporate entity. FFBI hereby assigns and transfers to FORMFACTOR, INC. ("FFI") all of FFBI's right, title and interest in and to this Lease and the Premises, and FFI assumes and agrees to be bound by the Lease, as amended hereby. The Guaranty of Lease dated as of June 5, 2018 (the "Guaranty") executed by FFI in connection with the Lease, is hereby cancelled, extinguished, and of no further force and effect; provided, however, the foregoing shall not extinguish FFI's liability for any obligations of FFBI under the Lease which remain unperformed and which accrued from and after June 5, 2018, and prior to the date of this Amendment, which obligations shall become obligations of FFI, as Tenant, under the Lease.

(continued on next page)

IN WITNESS WHEREOF, the parties have executed this document as of the date and year first above written.

G&I X NIMBUS CORPORATE CENTER  
LLC, a Delaware limited liability company

FORMFACTOR, INC.,  
a Delaware corporation

By: G&I INVESTMENT NIMBUS  
SERIES LLC,  
a Delaware Series limited liability  
company, its Managing Member

By:   
David Gray (Jan 14, 2022 11:32 EST)  
Name: David Gray  
Title: Vice President

By:   
Name: Matthew Losey  
Title: SVP and GM

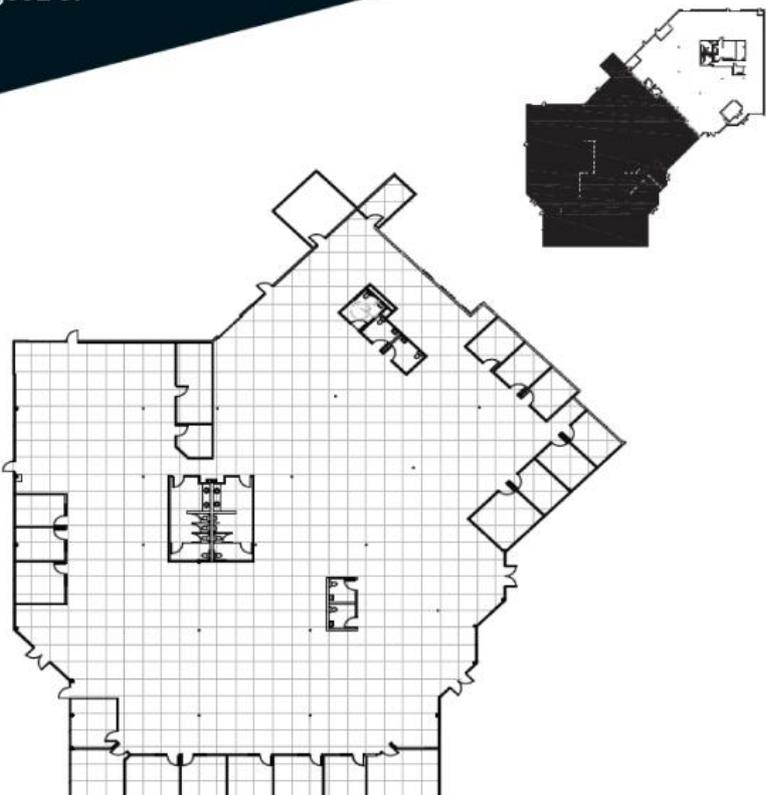
EXHIBIT A

Building 4 Premises

**Nimbus Corporate Center**  
SW Gemini Drive | Beaverton, Oregon

BUILDING  
**4**

**Suite 9400**  
**19,552 SF**



**FOR LEASING  
INFORMATION**

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## 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
FormFactor Technology (Suzhou) Co. Ltd.	People's Republic of China
FormFactor GmbH	Germany
Cascade Microtech Singapore Pte, Ltd	Singapore
FormFactor 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

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in the registration statements (No. 333-198760) on Form S-3 and (Nos. 333-266500, 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) on Form S-8 of our report dated February 24, 2023, with respect to the consolidated financial statements of FormFactor, Inc. and subsidiaries and the effectiveness of internal control over financial reporting.

/s/ KPMG LLP  
Portland, Oregon  
February 24, 2023

**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 24, 2023

/s/ MICHAEL D. SLESSOR

Michael D. Slessor  
Chief Executive Officer  
(Principal Executive Officer and Director)

**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 24, 2023

/s/ SHAI SHAHAR

Shai Shahar

Chief Financial Officer

(Principal Financial Officer and Principal Accounting Officer)

**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 31, 2022, 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

Date: February 24, 2023

/s/ MICHAEL D. SLESSOR

Michael D. Slessor  
*Chief Executive Officer*  
*(Principal Executive Officer and Director)*

Date: February 24, 2023

/s/ SHAI SHAHAR

Shai Shahar  
*Chief Financial Officer*  
*(Principal Financial Officer and Principal Accounting Officer)*

therein.