



2022

Annual Report



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

FORM 10-K

- 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
Commission File Number 001-37824

IMPINJ, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)
400 Fairview Avenue North, Suite 1200,
Seattle, Washington
(Address of principal executive offices)

91-2041398
(I.R.S. Employer
Identification No.)

98109
(Zip Code)

Registrant's telephone number, including area code: **(206) 517-5300**

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

Common Stock, \$0.001 par value per share (Title of each class)	PI (Trading Symbol)	The Nasdaq Global Select Market (Name of each exchange on which registered)
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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 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 has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes 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	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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 financing reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

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

As of June 30, 2022, the last business day of the Registrant's most recently completed second fiscal quarter, the aggregate market value of the Registrant's common stock held by non-affiliates based upon the closing price of such shares on The Nasdaq Global Market on such date was approximately \$1.3 billion.

As of February 3, 2023, 26,157,089 shares of common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this report, to the extent not set forth herein, is incorporated in this report by reference to the registrant's definitive proxy statement relating to its 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2022.

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As used in this report, the terms “Impinj,” “the Company,” “we,” “us” and “our” refer to Impinj, Inc., unless the context indicates otherwise.

RISK FACTORS SUMMARY

Our business is subject to numerous risks and uncertainties, including those highlighted in the section of this report captioned “Risk Factors.” These risks include, but are not limited to, the following:

- we operate in a very competitive market and if we fail to compete successfully, then our business and operating results will suffer;
- RAIN adoption is concentrated in key industries and the extent and pace of RAIN market adoption beyond these industries is uncertain;
- our ability to deliver platform solutions at scale are nascent;
- poor product quality could result in significant costs to us and impair our ability to sell our products;
- end users must design our products into their products and business processes;
- an inability or limited ability of enterprise systems to exploit RAIN information may adversely affect the market for our products;
- alternative technologies or standards, or changes in existing technologies or standards, may adversely affect RAIN market growth and our business;
- we obtain the products we sell through a limited number of third parties with whom we do not have long-term supply contracts;
- we are vulnerable to silicon wafer shortages, which have and may continue to adversely affect our ability to meet demand for our products;
- we rely on a small number of customers for a large share of our revenue;
- our ability to affect or determine end-user demand is limited in part because we sell and fulfill primarily through partners;
- our growth strategy depends in part on the success of strategic relationships with third parties and their continued performance and alignment;
- if we are unable to protect our intellectual property, then our business could be adversely affected;
- we are and may become party to additional intellectual property disputes, which are time consuming; costly to prosecute, defend or settle; could result in the loss of significant rights; and could adversely affect RAIN adoption or adoption of our platform;
- we have a history of losses and have only achieved profitability intermittently and we cannot be certain that we will attain or sustain profitability in the future;
- we have a history of significant fluctuations in our quarterly and annual operating results;
- our executive officers, directors and principal stockholders, together with their affiliates, beneficially owned approximately 22.0% of our outstanding common stock as of December 31, 2022, and as a result are able to exercise significant influence over matters subject to stockholder approval; and
- we may not have sufficient cash flow or access to cash necessary to satisfy our obligations under the \$287.5 million aggregate principal amount 1.125% convertible senior notes due 2027, or the 2021 Notes, and our current and future indebtedness may restrict our business.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This report contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Statements

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containing words such as “may,” “believe,” “anticipate,” “expect,” “intend,” “plan,” “project,” “projections,” “business outlook,” “estimate,” or similar expressions constitute forward-looking statements. You should read these statements carefully because they discuss future expectations, contain projections of future results of operations or financial condition or state other “forward-looking” information. These statements relate to our future plans, objectives, expectations, intentions and financial performance and the assumptions that underlie these statements. They include, but are not limited to, statements about:

- our market opportunity; the adoption of RAIN technology and solutions; our ability to compete effectively against competitors and competing technologies; our market share and product leadership; and our business model, strategic plans and product-development plans;
- the impact of Covid-19, including on our business, operations and financial condition as well as on macroeconomic conditions;
- our future financial performance, including our average selling prices, gross margins and the dependency of our future financial performance on macroeconomic conditions;
- the performance of third parties on which we rely for product development, manufacturing, assembly and testing; and our relationship with other third parties on which we rely for product distribution, sales, integration and deployment;
- our ability to adequately protect our intellectual property;
- the regulatory environment for our products and services; and
- our leadership in industry and standards-setting bodies.

Our actual results may differ materially from those contained in or implied by any forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this report, including those factors discussed in Part I, Item 1A (Risk Factors).

Considering the significant uncertainties and risks inherent in these forward-looking statements, you should not regard these statements as a representation or warranty by us or anyone else that we will achieve our objectives and plans in any specified time frame, or at all, or as predictions of future events. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of any forward-looking statements. We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

PART I

Item 1. Business

Overview

Our vision is a boundless Internet of Things, or IoT. We are driving a future in which everyday physical items are wirelessly connected to digital counterparts, or digital twins, in the cloud, and in which businesses and people access information about an item from its digital twin. Our mission is to connect every thing. We deliver a platform that powers item-to-cloud connectivity, and on which solution providers innovate IoT whole products.

Today, we deliver the identity, location and authenticity of billions of physical items. We believe our future is extending that delivery to trillions of physical items and enabling ubiquitous access to cloud-based digital twins of those items, each storing an item’s ownership, history and links. We believe the item connectivity that our platform delivers enhances businesses efficiencies and commerce and, ultimately, improve peoples’ lives.

Impinj Platform

Our platform, which comprises multiple product families, wirelessly connects individual items and delivers data about the connected items to business and consumer applications. We link the products within our platform to deliver capabilities and performance that surpasses mix-and-match solutions built from competitor products.

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We and our partners connect the items via a miniature radio chip embedded in the item or in its packaging, reading and delivering each item's identity, location and authenticity. To date, we have enabled connectivity to more than 75 billion items, enabling businesses and consumers to derive timely information from those connected items.

Our platform uses RAIN, a type of radio-frequency identification, or RFID, technology we pioneered. We spearheaded development of the RAIN radio standard, lobbied governments to allocate frequency spectrum and cofounded the RAIN Alliance that today has more than 150 member companies. Our industry uses free spectrum in 81 countries encompassing roughly 95% of the world's GDP. We believe RAIN's capabilities – in particular, endpoint ICs with serialized identifiers for individual items, battery-free operation, 30-foot range, not line-of-sight readability, up to 1,000 reads per second, low cost, essentially unlimited life and available cryptographic authentication – position RAIN to be the leading item-to-cloud connectivity technology for the IoT.

RAIN market adoption has historically been slower than anticipated by us and industry sources. For additional information related to RAIN market adoption, please see the section of this report captioned "Risk Factors."

Endpoint ICs

Our endpoint integrated circuit, or IC, product family comprises miniature radios-on-a-chip that sell for pennies and can wirelessly connect almost any item. Each IC attaches to a host item and includes a number to identify the item. The IC may also include or enable features such as user data storage, security, authentication, loss prevention, privacy protection and value-added Impinj custom capabilities, all accessible by our platform.

Our original equipment manufacturing, or OEM, partners typically attach an endpoint IC to a thin printed or etched antenna on a paper or Mylar backing, then cover the composite inlay with a paper face to form a tag. End users attach the tags to items used in markets including retail, supply chain and logistics, healthcare, automotive, sports, industrial and manufacturing, consumer experience, food, datacenter, travel and banking. In some more-recent applications, rather than attaching a tag to an item, end users may instead embed the inlay directly into the item, for example by sewing an inlay into a garment's care label. Regardless of the method by which our partners embed an endpoint IC into a host item, we refer to an IC and its host item as an endpoint.

When a consumer purchases a retail item, a store or supplier will typically procure another item to sell, including another endpoint IC. We believe endpoint ICs are the first market for consumable silicon and selling endpoint ICs is a recurring revenue source for us.

Systems

Our systems product family comprises reader ICs, readers and gateways that wirelessly provide power to, and communicate bidirectionally with, endpoint ICs on host items. They also read, write, authenticate and engage the endpoint ICs on those items. Our systems products include software and algorithms that enable our partners to deliver use cases such as retail self-checkout and loss prevention, and warehouse pallet and package tracking, to end users worldwide.

Our reader IC product family comprises multiple products, tiered by performance and functionality, that our reader IC partners use in their readers. We offer easy-to-use application programming interfaces, or APIs, sample code, development environments, drivers and libraries to facilitate partner reader development. We leverage our reader and gateway software to enhance the firmware in our reader ICs. We sell our reader ICs to OEM and original design manufacturing, or ODM, partners that use them in mobile or handheld readers, fixed readers, gateways, RAIN-enabled appliances and other intelligent edge devices. We sell our reader ICs for tens of dollars.

Our reader product family comprises multiple finished products, tiered by performance and functionality. Our gateway product family integrates our readers with beamforming antennas to electrically steer a radio beam like a radar, locating and tracking items in one or two dimensions. Our partners can use our readers and gateways to enable end-user solutions. Our readers and gateways are easy to deploy and use, can be powered via power-over-Ethernet, or PoE, and are certified for operation in more than 40 countries.

Our software and algorithms run either entirely on our readers and gateways or partly on them and partly on partner devices. We are currently focused on developing software and algorithms to enable retail use cases (such as self-checkout and loss prevention), and on supply chain and logistics use cases (such as pallet tracking in dock

doors and package sortation on conveyors). Our APIs allow partners to transform item data into actionable information, enabling analytics and insights about the items that businesses manufacture, transport and sell. Our APIs also help our partners deliver enterprise-grade systems management and control. We sell our readers and gateways through distributors, system integrators, or SIs, value-added resellers, or VARs, and solution providers. We sell our readers for hundreds of dollars and our gateways for thousands of dollars.

Industry Use Cases

The following use cases are representative of actual RAIN deployments we serve today.

Retail

Retailers, both traditional “brick-and-mortar” and online, consume billions of RAIN tags each year to obtain real-time data about products they manufacture, transport and sell. Today, most retail products with RAIN tags are apparel and footwear, but retailers are extending RAIN usage to general merchandise including toys, home goods, electronics, auto parts, magazines, stationary, sporting items, cosmetics and even food. Retailers can obtain the following benefits by using our platform:

- *In-store Inventory Visibility.* Our platform delivers accurate and timely data about a retailer’s product inventory. Accurate inventory data can reduce overstocks, understocks and searching, thereby allowing retailers to reduce inventory and increase same-store sales by ensuring each store is properly stocked and by enabling staff to focus on customers rather than on inventorying or searching for items.
- *Omnichannel Fulfillment.* The cornerstone of a successful omnichannel operation is real-time inventory visibility in stores, warehouses and fulfillment centers. The visibility our platform delivers can help or enable retailers ship directly from those stores, warehouses and fulfillment centers as well as allow consumers to buy online and pickup in store. It can also help retailers sell to any customer from any retail location, confidently sell to the last item and facilitate seamless returns.
- *Self-checkout and Loss Prevention.* Consumer self-checkout is a clear opportunity for retailers looking to modernize their in-store experience. However, self-checkout requires effective loss prevention. Our platform can enable both – self-checkout via sales terminals that read endpoint ICs on items and loss-prevention systems that scan RAIN tags for unsold items leaving the store. As our inlay partners focus on embedding RAIN tags directly into retail items, we focus on key innovations like our patented Protected Mode that allows a tag to require a PIN for post-point-of-sale readability, enabling loss-prevention systems to focus on unsold items while satisfying General Data Protection Regulation, or GDPR, and similar privacy requirements.

Supply Chain and Logistics

The supply chain and logistics, or SC&L, industry includes shipping companies, third-party logistics providers, postal organizations, captive distribution operations and other organizations transporting products nationally and internationally. These organizations are increasingly demanding real-time shipment data to virtualize, analyze and optimize their operations. SC&L companies can obtain these benefits using our platform:

- *Shipment Verification.* Our platform provides real-time data about items passing through dock doors to the systems that run shipping and receiving, enabling SC&L companies to reduce mistakes, automate processes and drive operational efficiencies.
- *Conveyor Sortation.* Our platform enables high-speed, real-time, not line-of-sight reading of packages moving along conveyors, improving automatic sortation accuracy and reducing costly shipping errors.
- *Returnable Transit Item, or RTI, Tracking.* By tagging RTI containers, our platform can reduce RTI loss and ensure SC&L companies have the RTI containers they need.
- *Asset Management.* Our platform enables automated asset check-in/out procedures and location monitoring, reducing loss and improving efficiencies and maintenance-schedule compliance.

Other Industries

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These other industries can also obtain benefits using our platform:

- *Aviation.* Luggage tags that incorporate our endpoint ICs allow airlines to give passengers real-time location information for their checked bags as well as reduce lost bags.
- *Automotive.* Car manufacturers use our platform to track and verify automotive parts for vehicle assembly, reducing mistakes and labor costs and improving operations.
- *Healthcare.* Hospitals use our platform to track assets and manage patient and clinician workflows. Partner products built on our platform include RAIN-enabled medical cabinets and refrigerators.
- *Industrial and Manufacturing.* Industrial companies track components to increase manufacturing productivity and reduce shipping errors. Manufacturers use our platform to track assets and tools, reducing errors and increasing calibration compliance.
- *Sports.* Marathons and other foot races track runners via our endpoint ICs in race bibs. Golf venues score participants' shots via our endpoint ICs inside golf balls.
- *Food.* Our reader ICs track syrup cartridges for replenishment in soda fountains. Our endpoint ICs track meat, fish and fresh produce for freshness.
- *Datacenters.* Datacenters use our platform for asset tracking. Electronics manufacturers embed our endpoint ICs into electronic devices for processor-secured storage.
- *Travel.* Driver licenses in some states in the United States include our endpoint ICs to speed border crossings. Fueling stations use vehicle windshield tags to enable automatic and cashless fueling.
- *Banking.* Banks use our endpoint ICs for money bundles and to track information-technology assets.
- *Linen and Uniform Tracking.* Laundry providers embed washable tags into their linens and uniforms for automated tracking.

Competitive Advantages

We believe we can extend our leadership of the RAIN market by leveraging our competitive strengths, including:

- *Platform.* Our platform integrates our products and enables enhanced functionalities in ways we believe surpasses mix-and-match solutions built from competitor components, improving overall RAIN system performance, capabilities, reliability and ease-of-use.
- *Market Leadership.* We believe we lead the RAIN market as the only company with an integrated platform spanning endpoint ICs, reader ICs, fixed readers and gateways.
- *Technology Leadership.* Our RAIN focus has enabled us to regularly be first-to-market with innovative, high-performing and high-quality products. Our chief executive officer is a recognized industry thought leader, a director of the RAIN Alliance and previously was an editor for the RAIN radio standard.
- *Partner Ecosystem.* Our worldwide partner ecosystem comprises hundreds of distributors, SIs, VARs, software solution partners and reader, inlay and tag ODMs and OEMs. That ecosystem gives us market reach, penetration and scale we believe few, if any, of our competitors enjoy.
- *Trusted Brand.* We believe our industry leadership, name recognition and reputation for innovative, high-performing and high-quality products have significantly contributed to our leading market position.
- *Intellectual Property.* We believe we have the leading RAIN patent portfolio. As of December 31, 2022, our portfolio included 296 issued and allowed U.S. patents, five issued and allowed international patents, 20 pending U.S. patent applications and 7 pending international patent applications.

Growth Strategies

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To further our mission of connecting every thing, we plan to focus on the following strategic areas:

- *Develop Enterprise Solutions:* Focus on developing repeatable enterprise solutions with top-tier partners, enhancing and expanding our product offerings and deepening our platform integration with those partners.
- *Deliver Our Platform:* Continue investing in our platform's products, software and algorithms, use cases, differentiated capabilities and cost reductions.
- *Lead the RAIN silicon opportunity:* Invest in endpoint IC performance, features, cost reduction and platform integration to win endpoint IC opportunities across all verticals and geographies.
- *Ubiquitous Reading:* Advance our reader ICs to improve functionality, reduce costs and make Impinj-based partner readers ubiquitous.
- *Cloud Services:* Invest in cloud services that leverage differentiated features in our endpoint ICs, such as cryptographic authentication, to enhance our platform's reach and breadth and enable new use cases and recurring-revenue opportunities.

Sales and Marketing

We have a worldwide sales team with expertise in endpoint ICs, reader ICs, readers, gateways and solutions. We also have a global ecosystem of hundreds of partners. Our sales team enables end-user solutions through, with and alongside those partners, fulfilling through the partners primarily as follows:

- *Endpoint ICs:* Directly to inlay and tag OEMs. We typically negotiate pricing with these OEMs annually, with new pricing effective during the first quarter of the calendar year.
- *Reader ICs:* Through distribution to handheld and fixed reader OEMs and ODMs.
- *Readers and gateways:* To solutions providers, VARs and SIs through distributors.

We aim to engender preference for our platform in all our sales engagements, encouraging our partners and end users to use and gain the full benefit of our entire platform. Our business development, product marketing, technical and systems engineers actively engage those partners and end users. Our solutions-marketing and business-development teams also work with independent software vendor, or ISV, partners to enable end-user awareness, joint solutions, joint go-to-market selling and sales enablement.

Avery Dennison Corporation, or Avery Dennison, and Arizon RFID Technology (Yangzhou) Co., LTD, or Arizon, purchase our endpoint ICs for their inlay and tag products. The following table presents total revenue concentration to Avery Dennison and Arizon for the periods presented:

	Year Ended December 31,		
	2022	2021	2020
Revenue:			
Avery Dennison ⁽¹⁾	28%	32%	32%
Arizon	10	11	10
	<u>38%</u>	<u>43%</u>	<u>42%</u>

(1) Includes revenue concentration related to Smartrac. Avery Dennison acquired Smartrac in March 2020.

Manufacturing

We outsource all our product manufacturing to third-party manufacturers that build our products to our specifications. This capital-efficient operating model scales efficiently with volume, allowing us to focus our resources on accelerating development of new products and solutions.

Taiwan Semiconductor Manufacturing Company Limited, or TSMC, fabricates our endpoint IC wafers in Asia and the United States and has been our sole endpoint IC wafer supplier since 2003. We order endpoint IC wafers on a purchase-order basis and do not have a long-term agreement with TSMC. We test the wafers in Asia and at our U.S. headquarters. We use multiple subcontractors to post-process the wafers including Stars Microelectronics (Thailand) Public Company Limited, or Stars, Chipbond Technology Corporation, or Chipbond, and Unisem Group, or Unisem. We generally engage all our endpoint IC subcontractors on a purchase-order basis.

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Tower Semiconductor, or Tower, and TSMC fabricate our reader IC wafers. Tower fabricates reader IC wafers in the United States and has been our supplier since 2008. TSMC fabricates reader IC wafers in Asia and has been a reader IC supplier since 2021. We order reader IC wafers on a purchase-order basis and do not have a long-term agreement with Tower or TSMC. We test and package the reader ICs in Asia. We generally engage all our reader IC subcontractors on a purchase-order basis.

Plexus Corp., or Plexus, manufactures our readers and gateways in Asia, since 2005. We order readers and gateways pursuant to non-exclusive purchase agreements that automatically renew each year, subject to each party's right to terminate on 180 days' notice. We use subcontractors on a purchase-order basis to assemble and test printed circuit boards, to build our reader and gateway enclosures and to test our readers and gateways.

Research and Development

We built our company around technology leadership, innovation and best-in-class products. Throughout our history we have committed, and we plan to continue committing, significant resources to technology, innovation and product development. We believe we have achieved our leading market position by continuously improving product performance, features, quality and reliability while reducing costs, and we plan to invest to continue doing so.

In most situations, we strive to lead the market with new products and innovations, but we sometimes adopt a more deliberate approach depending on the market situation. As one example, our nearest endpoint IC competitor migrated from 200mm wafers to 300mm wafers before we did. That migration caused the inlay OEMs to gradually retrofit their inlay manufacturing machines to handle 300mm wafers. In the meantime, we focused on an endpoint IC process-node migration, which we completed in 2020. Our first products in that process node, the Impinj M730 and M750, are not only on 300mm wafers, but today have roughly twice as many ICs per wafer as that competitor and entered the market with the inlay OEMs already able to process 300mm wafers.

We have a team of skilled engineers that today conduct all our research and most of our product development internally. As of December 31, 2022, we had 205 employees in research and development. We regularly review our technology, products and market development opportunities and reallocate our spending and resources accordingly.

Intellectual Property

We protect our technologies by filing patent applications, retaining trade secrets and defending and enforcing our intellectual property rights where appropriate. To date, our intellectual property portfolio includes 296 issued and allowed U.S. patents, five issued and allowed international patents, 20 pending U.S. patent applications and 7 pending international patent applications. The first of our 281 utility patents expire in 2023 and the first of our 15 design patents expire in 2023. To protect confidential information not otherwise subject to patent protection, we rely on trade secret law and enter into confidentiality agreements with our employees, customers, suppliers and partners.

Because most RAIN products are used in the United States, and because most of our partners, end users and competitors have U.S. operations, we believe U.S. patents hold the most value for our business. Consequently, we have primarily filed U.S. patent applications. Because our portfolio currently comprises mostly U.S. patents, we have limited ability to assert our intellectual property rights outside the United States.

Although our patents and trade secrets constitute valuable assets, we do not view any one of them as material. Instead, we believe the totality of our patent and trade-secret portfolio creates an advantage for our business.

We have entered into licensing, broad-scope cross licensing and other agreements authorizing us to use or to operate within the scope of patents and intellectual property owned by third parties. For example, we have licenses to third-party intellectual property that we use in our products. As another example, by participating in developing GS1 EPCglobal protocols, such as the RAIN radio protocol, we agreed to license those of our patents necessary to practice those protocols on a royalty-free basis to other GS1 EPCglobal members, subject to reciprocal royalty-free rights from those members. By participating in developing International Organization for Standardization, or ISO, standards, we agreed to grant to all users worldwide a license to those of our patents necessarily infringed by the practice of several ISO standards, including RAIN and non-RAIN standards, on reasonable and nondiscriminatory terms, here again subject to reciprocity.

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We own a number of trademarks and develop names for our new products and secure trademark protection for them, including domain name registration, in relevant jurisdictions.

Alliances and Standardization

Our platform connects everyday items using the RAIN technology we pioneered. We spearheaded developing the RAIN radio standard, lobbied governments to allocate frequency spectrum and, along with Google, Intel and Smartrac, cofounded the RAIN Alliance. Our chief executive officer is presently an Alliance Director and was previously the Alliance Chairman. The Alliance is a global organization promoting the universal adoption of RAIN technology and solutions, with more than 150 members as of December 31, 2022. Today, the RAIN industry has access to radio spectrum freely available in 81 countries encompassing roughly 95% of the world's GDP. We believe RAIN's core capabilities – serialized identifiers for individual items, battery-free operation, 30-foot range, not line-of-sight readability, up to 1,000 reads per second, low cost, essentially unlimited life and available cryptographic authentication – position RAIN to be the leading item-to-cloud connectivity technology for the IoT.

We, our end users, partners and competitors developed the RAIN radio protocol, whose technical name is EPC™ Radio-Frequency Identity Protocols Generation-2 UHF RFID (standardized as ISO/IEC 18000-63 and often known colloquially as Gen2) in 2004, with us as editor. Our community delivered a backward-compatible update in 2013, again with us as editor. Our community is currently developing another update, again with us as an editor. Our industry uses the RAIN radio protocol nearly exclusively.

By participating in GS1 EPCglobal, which produced Gen2, and ISO, which ratified 18000-63, as well as in other standards bodies, we agreed to license certain necessary patents as described in the section captioned “Intellectual Property.”

Government Regulations

Government regulations require us to certify our readers and gateways in jurisdictions where they operate. For example, we certify our readers and gateways to Federal Communications Commission regulations to operate in the United States and its territories. Our readers and gateways are certified for operation in more than 40 countries worldwide including the United States, Canada, Mexico, China, Japan, South Korea and all of the European Union.

Competition

Each of our competitors competes with some, but not all, of our products. Our primary competition includes:

- *Endpoint ICs*: NXP B.V., or NXP, EM Microelectronic, Kiloway, Fudan Microelectronics Group and Alien Technology Corporation, or Alien.
- *Reader ICs*: STMicroelectronics N.V., or ST, Phychips Inc, Zhikun Semiconductor Co. Ltd, or Iotelligent, and MagicRF.
- *Readers and Gateways*: Zebra Technologies Corporation, or Zebra.

The market for RAIN, our platform and our products is highly competitive. New entrants can and do come into our market at any time, and we expect competition to increase as the market and end-user adoption grow. The competitive factors that impact our platform and product sales include:

- portfolio, performance, features, lead times, reliability and price;
- support, ease of use and availability of reference designs;
- development tools and APIs (except in the endpoint IC market);
- integration and certification with end-user applications; and
- company reputation.

Although we believe we compete favorably on the above factors, our future competitiveness will depend on our ability to design, develop and deliver compelling products and enable compelling end-user solutions.

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Because our product pricing is denominated in U.S. dollars, we occasionally experience competitive pressures due to prevailing exchange rates. In addition, our competitive position depends on our ability to continue attracting and retaining talent while protecting our intellectual property. For additional information on the risks associated with our business, see “Risk Factors.”

Employees and Culture

As of December 31, 2022, we had 389 employees. Most of our employees are not represented by a labor union and we believe our employee relations are excellent.

Our corporate culture embodies a set of principles centered around respect, collaboration, accountability, empowerment and thinking big. We believe our principles and the culture that derives from them are essential to the health and success of our business. We focus on aligning our employees to those principles and promoting and fostering diversity, equity, inclusion, passion and commitment.

Available Information

We were incorporated in Delaware in April 2000. Our principal executive office is located at 400 Fairview Avenue North, Suite 1200, Seattle, Washington 98109. Our telephone number is (206) 517-5300. Our website is www.impinj.com. Information contained in, or that can be accessed through, our website is not a part of, and is not incorporated into, this report.

Our filings with the Securities and Exchange Commission, or SEC, including our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, as well as amendments to those reports are available on our website at www.investor.impinj.com, free of charge, as soon as reasonably practicable after the electronic filing of those reports with the SEC. The information contained on our website is not a part of this report or any other document we file with the SEC.

Item 1A. Risk Factors

You should carefully consider the following risk factors, in addition to the other information contained in this report, including the section of this report captioned “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and related notes. If any of the events described in the following risk factors and the risks described elsewhere in this report occur, then our business, operating results and financial condition could be materially impacted. This report also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements due to factors that are described below and elsewhere in this report.

Risks Relating to Our Platform, Products and Technologies

We operate in a very competitive market.

Our principal current competitors are:

- In endpoint ICs, NXP, EM Microelectronic, Kiloway, Fudan Microelectronics Group and Alien;
- in reader ICs, ST, Phychips, Iotelligent and MagicRF; and
- in readers and gateways, Zebra.

These competitors include companies that have much greater financial, operating, research and development, marketing and other resources than us. To gain market share, they could discount their products and accept lower margins, or they could maintain margins by achieving cost savings through better, more efficient designs or production methods. They could devote more resources than we can to product development, promotion, sale and support. They could also bundle other technologies, including those we do not have in our product portfolio, with their RAIN products.

Our partners, including our OEMs, ODMs, distributors, SIs, VARs and solution partners, may choose to compete with us rather than purchase our products, which would not only reduce our customer base but also

increase competition in the market. Companies in adjacent markets or newly formed companies may decide to enter our market, particularly as RAIN adoption grows. Further, the Chinese government has made development of the Chinese semiconductor industry a priority, potentially increasing competition for us globally while possibly restricting our ability to participate in the Chinese market.

RAIN adoption is concentrated in key industries and the extent and pace of RAIN market adoption beyond those industries is uncertain.

Our financial performance depends on the pace of end-user RAIN adoption in key industries such as retail apparel, our largest market, retail general merchandise and SC&L. Although RAIN has been adopted to some degree by end users in those industries, those end users as well as the industries themselves are subject to business cycles. Continued RAIN adoption by those end users and in those industries may be at risk if and when downcycles occur.

Outside those key industries, the RAIN market is still developing. RAIN adoption, as well as adoption of our platform and products, depend on many factors, including the extent to which end users understand and embrace the benefits that RAIN offers; whether the benefits of RAIN adoption outweigh the cost and time to replace or modify end users' existing systems and processes; and whether RAIN products and applications meet end users' current or anticipated needs.

We have, at times, anticipated and forecasted a pace of end-user adoption that exceeded the actual pace. We expect continued difficulty forecasting the pace of adoption. As a result, we may be unable to accurately forecast our future operating results including revenue, gross margins, cash flows and profitability, any or all of which could negatively impact our financial performance.

We are expected to introduce new products and product enhancements on a regular basis.

We introduce new products and services to advance our business, satisfy increasingly demanding end-user requirements and grow RAIN market adoption. We commit significant resources developing and introducing these new products and services. We also commit significant resources improving the performance and reliability of, and reducing the costs of, our existing products and services.

Whether our new products and services will succeed is uncertain. Our success in developing the technologies, processes or capabilities necessary or desired for new or enhanced products and services, or licensing or otherwise acquiring them from third parties, and our ability to introduce new products and services before our competition, depends on many factors, including:

- our ability to identify new product capabilities or services that will be widely adopted;
- our timely and efficient completion of the design process;
- our timely and efficient implementation of manufacturing, assembly and testing procedures;
- our attainment of appropriate product or service performance levels and product certification;
- partnering successfully with others to deliver complementary products or services;
- the quality, reliability and selling price of our product or service; and
- the effectiveness of our marketing, sales and service.

When we introduce new products, our success in ramping adoption depends, in part, on us making those products easy to deploy by our partners and their end users. For example, for our new M700-family endpoint ICs and E-family reader ICs, we continue supporting our partners to produce high-performing, high-quality products. Until our partners are able to deploy our products widely, adoption and our operating results could suffer.

Our abilities to deliver platform solutions at scale are nascent.

We believe we are still at a very early stage in our ability to deliver enterprise solutions. We are developing solutions for retail self-checkout and loss prevention and SC&L package routing that have been, or that we expect to be, deployed by the industry-leading enterprise end users for whom we are developing the solutions. However, to fully capitalize on our platform's potential, we must make our current offerings repeatable across multiple

enterprises as well as deliver additional solutions to enterprise needs. If we do not succeed in identifying, developing and deploying enterprise solutions across a range of industries and customers, then our business prospects will suffer.

Delivering solutions that address enterprise needs requires a network of partner products and services that complement our own product offerings and that together address complex enterprise needs. Convincing enterprises to engage us to solve their business problems – including evaluation, design, deployment, operations and partner services, including leveraging RAIN data into the enterprise's information systems, requires tight coordination among our and our partners' sales, marketing, operations and engineering teams. Although we today have partners who successfully introduce our platform, or aspects of it, to their customers, their knowledge of our platform and RAIN in general is still nascent. If we do not build our network of solutions and partners to deliver those solutions and broaden our efforts to deliver solutions that leverage our platform in large, complex enterprise opportunities, then our business prospects will suffer.

We rely on endpoint IC sales to generate most of our revenue.

We derive, and expect to continue to derive, most of our product revenue from our endpoint ICs. If demand declines, or if we are unable to procure enough wafers to meet the demand we have, or if we are unable to raise prices to offset cost increases, then our business and operating results will suffer. In addition, the continued adoption of, and demand for, our existing endpoint ICs, as well as for our new endpoint ICs, derives in part from our ability to continually innovate and to demonstrate the benefits of using our endpoint ICs with our reader ICs, readers and gateways. If we fail to establish the benefits of using our endpoint ICs with our platform, then we may be unsuccessful in countering competitive pressures to lower prices for our endpoint ICs and our business and operating results could be adversely affected.

The selling prices of our products could fluctuate substantially.

The average selling price, or ASP, of our products has historically decreased with time, to meet end-user demands, to encourage adoption, to address macroeconomic conditions or to respond to market pressure from our competition. However, that trend is not constant and we have also increased prices from time to time. Although we expect further price decreases in the long term, we raised prices in 2021 and 2022 to accommodate higher product costs. We may be required to raise prices again if macroeconomic conditions, including inflation, create upward pressure on our product costs. If we are unable to offset ASP reductions with increased sales volumes or reduced product costs, or if we are unable to successfully increase ASPs to offset cost increases, then our revenue and gross margins will suffer.

When demand for older products declines, or during times of increased market inventory, ASPs may decline quickly. To sell our products profitably we must continually improve our technology and processes and reduce costs in line with the lower selling prices. If we and our product suppliers and manufacturers cannot create and implement processes or improve efficiencies sufficient to maintain our margins, then we may be unable to sell our products profitably.

Pricing commitments and other restrictive provisions in our customer agreements could adversely affect our operating results.

In the ordinary course of our business, we enter into agreements containing pricing terms that could, in some instances, adversely affect our operating results and gross margins. For example, some contracts specify future IC, reader or gateway pricing or contain most-favored-customer pricing for certain products. Other agreements contain exclusivity terms that prevent us from pursuing certain business with other customers during the exclusivity period. Reducing prices or offering favorable terms to one customer could adversely affect our ability to negotiate favorable terms with other customers.

Changes in our product mix could adversely affect our overall gross margin.

We generate most of our revenue from endpoint IC sales which have, for the most part, lower gross margins than our systems product sales. Our overall product gross margins are affected by product mix, which can fluctuate based on demand and supply, competitive pressures and end-user needs and demand. A shift in sales mix away from our higher margin products to lower margin products, either within our endpoint IC product portfolio or from our systems business to our endpoint ICs, could negatively affect our gross margins.

Poor product quality could result in significant costs to us and impair our ability to sell our products.

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Our products must meet demanding specifications for quality, reliability and performance. Our products are both highly technical and deployed in large, complex systems in which errors, defects or incompatibilities can be problematic for our partners and end users.

If we are unable to correct errors, defects, incompatibilities or other problems in our products, we could experience:

- loss of customer orders or customers;
- lost or delayed market acceptance or sales;
- loss of market share;
- damage to our brand and reputation;
- impaired ability to attract new customers;
- diversion of development resources;
- increased service and warranty costs;
- replacement costs;
- legal actions by our partners or end users; and
- increased insurance costs.

Moreover, if we encounter product quality issues, then we may be required to incur significant time and costs to diagnose, test and fix the issues, and these efforts could further constrain our ability to supply our partners and end users with new products until we have resolved the issues.

End users and partners must design our products into their products and business processes.

Persuading end users or partners to design our products into their business processes or products requires educating them about RAIN's and our products' value. They may use other technologies or products and may not feel the need to learn about how RAIN or our products can improve their business processes or products. Even when convinced, they often undertake long pilot programs or qualification processes prior to placing orders. These pilot programs or qualification processes can be time consuming and expensive, and there is no assurance they will result in an order for our products. If we fail to develop new products that adequately or competitively address end users' or our partners' needs, then we may not receive product orders, which could adversely affect our business, prospects and operating results.

Our visibility into the length of the sales and deployment cycles for our products is limited.

We have limited visibility into end user sales and deployment cycles, and these cycles are often longer than we anticipate. Many factors contribute to our limited visibility, including the time our partners and end users spend evaluating our products, the time educating them on RAIN's benefits, and the time integrating our products with end users' systems. The length and uncertain timing of the sales and deployment cycles can lead to delayed product orders. In anticipation of those orders, we may incur substantial costs before the sales cycle is complete and before we receive any customer orders or payments, if we receive them at all.

An inability or limited ability of end user systems to exploit RAIN information may adversely affect the market for our products.

A successful end-user deployment requires not only tags and readers or gateways, but RAIN integration with information systems and applications that create business value from the RAIN data. Unless third parties continue developing and advancing business analytics tools, and end users enhance their information systems to use these tools, RAIN deployments could stall. Our efforts to foster third-party development and deployment of these tools could fail. In addition, our guidance to business-analytics providers for integrating our products with their tools could prove ineffective.

Solution providers and SIs are essential to the RAIN market. They provide deployment know-how to enable end users to successfully deploy RAIN solutions. Integrating our products with end-user information systems could prove more difficult or time consuming than we or they anticipate, which could delay deployments.

Alternative technologies may enable products and services that compete with ours.

Technology developments may affect our business negatively. Breakthroughs in legacy RFID technologies or markets, including those using low frequency or high frequency RFID technology, or in other radio technologies, could adversely affect RAIN market growth and demand for our products. Likewise, new technologies may enable lower-cost ICs than our products. If we are unable to innovate using new or enhanced technologies or are slow to react to changes in existing technologies or in the market, or if we have difficulty competing with advances in new or legacy technologies, then our development of new or enhanced products could be impacted and result in product obsolescence, decreased revenue and reduced market share.

Significant changes in RAIN standards bodies, standards or qualification processes could impede our ability to sell our products and services.

We participate in developing RAIN industry standards, including with GS1 and ISO, and have designed our products to comply with those standards. We have historically taken a leadership position in standards development. In the future, we could lose that leadership position or our influence in standards development, or we could choose not to participate in certain standards activities.

New or changed industry standards could cause us to incur substantial development costs to meet the new or changed standards. If industry standards diverge from our or the RAIN market's needs, then our products may fail to keep pace with the market or cause end users to delay their deployments. Moreover, the adoption or expected adoption of new or changed standards could slow sales of our existing products before we can introduce new products that meet the new or changed standards. New standards or changes to existing standards could also limit our ability to implement new features in our products. The lost opportunities as well as time and expense to develop new products or change our existing products to comply with new or changed standards could be substantial, and we may not ultimately succeed in developing products that comply with new or changed standards.

Certain organizations develop requirements for RAIN tags and test tags against those requirements. As one example, the ARC Program at Auburn University, or ARC, develops tag performance and quality requirements for end users that engage them. Some participants in the RAIN market are ARC sponsors, but we are not among them. Some other organizations perform this function as well. ARC or a similar organization could develop specifications that some or all of our endpoint ICs fail to meet.

Changes in government spectrum regulations or in their enforcement could adversely affect our ability to sell our products.

Government radio regulations require that our readers and gateways be certified for spectral compliance where they are sold or operated. Our readers and gateways are collectively certified for use in more than 40 countries worldwide, including the United States, Canada, Mexico, China, Japan, South Korea and every country in the EU. If one of our reader or gateway products is found to be noncompliant despite being certified, we could be required to modify field-deployed readers or gateways and could spend significant resources and miss sales opportunities in the process.

Government regulations may change, possibly without notice, requiring us to redesign our products to conform with the new regulations or constraining our ability to incorporate new features into our products. Such changes could cause us to incur significant costs, including costs associated with obsolete inventory. Regulatory changes may also cause us forego opportunities to improve our products, potentially delaying our time-to-market.

Sales of some of our products could cannibalize revenue from other products.

Some of our partners develop products using some of our products that compete with other of our products. For example, some of our OEM partners use our reader ICs to build and sell readers and gateways that compete with our readers and gateways. Similarly, some of our partners use our readers to build and sell gateways that compete with our gateways. If we fail to manage such conflicts successfully, then our business and operating results could be negatively affected.

Risks Relating to Our Personnel and Business Operations

We obtain the products we sell through a limited number of third parties with whom we do not have long-term supply contracts.

Our ability to secure cost-effective, quality products in a timely manner could be adversely affected by many factors, including:

- Third-party manufacturing capacity may not be available when we need it, particularly from our foundry partners from whom we procure silicon wafers.
- Efforts to diversify our supplier base may be unsuccessful or may not result in us obtaining the anticipated benefits of such diversification.
- Some products have long lead times, and we place orders for them many months before our anticipated delivery dates to our customers. If we inaccurately forecast customer demand, then we may be unable to meet our customers' delivery requirements or we may accumulate excess inventory, increasing our costs.
- Supply disruptions may affect our ability to meet partner or end user demand, whether in a cost-effective manner or at all, potentially causing those partners or end users to cancel orders, qualify alternative suppliers or purchase from our competitors. Supply disruptions can also distort demand, making it even harder to meet true demand with finished products.

If our suppliers fail to manufacture our products at reasonable prices or with satisfactory quality levels, then our ability to bring those products to market and our reputation could both suffer. If supplier capacity diminishes, whether from equipment failures, closures, bankruptcy, capacity allocation, in response to Covid-19, catastrophic loss of facilities or otherwise, then we could have difficulty fulfilling orders, our revenue could decline and our growth prospects could be impaired. Transitioning our product manufacturing to new providers would take many months and, in the case of ICs, could take years. Any transition would require a requalification by our customers or end users, which could also adversely affect our ability to sell our products as well as our operating results.

Shortages of silicon wafers and components used in our readers and gateways may adversely affect our ability to meet demand for our products and adversely affect our revenue and/or gross margins.

The semiconductor industry has experienced many periods of capacity shortfall and just experienced another due to increased post-Covid demand. In particular, in both 2021 and 2022 we experienced tight wafer availability, and although our foundry partner has signaled improving wafer availability in 2023, they have also raised prices. The semiconductor industry may continue to experience significant supply/demand imbalances, resulting in continued constraints on wafer availability. We procure wafers on a purchase-order basis from our foundry partners; consequently, wafer supply is not contractually guaranteed and there can be no assurance that we will receive adequate wafer supply from our foundry partners in 2023 or in the future.

Wafer shortfalls limit sales and may cause market-share losses if we are unable to supply enough products or our customers purchase competing products or, alternatively, may artificially increase bookings as customers over-order our products, followed by sales declines in future periods as they consume their accumulated inventory. Additionally, if we are unable to raise our prices to cover our higher costs, our gross margins and other financial results could suffer.

As we recover from wafer shortages, we may invest in inventory to support anticipated business growth, like we did with endpoint IC inventory in 2017 and 2020. If we are unable to sell the inventory we purchased, or if we must sell it at lower prices due to excess inventory or obsolescence, then our business will be negatively impacted.

To convert the wafers we receive from our foundry partner into saleable products, we and several third parties perform additional procedures, such as testing, thinning, dicing and bumping the ICs. If we or our partners are unable to efficiently perform these post-processing procedures, or if we experience any capacity constraints with respect to these post-processing procedures, then we may be unable to keep up with demand for our products and our financial results will suffer.

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We have also experienced shortages and price increases for components we use in our readers and gateways, as well as in packaging and test capacity for our reader ICs, and we may continue to experience such shortages and price increases in the future. Any such shortages or price increases will negatively impact our product availability and costs. If we are unable to procure sufficient components and to increase our prices to cover our increased costs, then our financial results will suffer.

We bear inventory risks due to our reliance on partners to sell and distribute our products.

We typically order products from our suppliers based on partner forecasts before we receive purchase orders. However, many of our partners have difficulty accurately forecasting their demand and the timing of that demand. They also sometimes cancel orders or reschedule product shipments, in some cases with little or no advance notice to us. We also sometimes receive soft commitments for large orders which do not materialize. In addition, when we introduce new products, we may initially carry higher inventory or have slower inventory turns depending on market acceptance. We have additional uncertainty arising from competition and from unanticipated external events, such as changes in regulatory standards, all of which can adversely affect demand and consequently our inventory levels, sales and operating results.

Covid-19 has adversely affected our business, and the magnitude and duration of future Covid-19 effects on our business are uncertain.

Since 2020, Covid-19 has created significant worldwide economic volatility, uncertainty and disruption, and those effects may persist. Our significant continuing Covid-19 risks include:

- uncertain product demand globally;
- product availability delays and shortages;
- challenges in effectively managing our inventory due to uncertain supply or demand;
- partner-requested preordering or rescheduling as a result of supply concerns, possibly distorting channel inventory, either positively or negatively;
- increased operating and product costs;
- delays in research and development efforts, which, in turn, could delay new product introductions or product enhancements; and
- maintaining employee engagement and productivity in a remote or hybrid work environment.

The extent to which Covid-19 will continue impacting market demand is unclear. In 2020 and 2021, Covid-19 adversely affected retail, including retail apparel, where RAIN is widely adopted. It also affected other markets that use our products including aviation, sporting events such as footraces, and others.

Our international supply chains remain vulnerable to Covid-19 related disruptions because most our products are manufactured and processed in Asia, which until fairly recently imposed regional lockdowns and which is still experiencing significant negative impacts of Covid-19. Accordingly, risks associated with Covid-19 on our future product supply remain.

Changes in global trade policies could have a material adverse effect on us.

Changes in U.S. and foreign laws and policies governing foreign trade, manufacturing, development and investment in the jurisdictions where we currently develop and sell products, and any negative consequences resulting from such changes, could materially affect our business.

The U.S. government has imposed significant tariffs on a variety of items imported from other countries, particularly China. China responded by imposing significant tariffs on a variety of items imported from the United States. These tariffs could materially and adversely affect our ability to compete internationally. Although the United States and China signed a preliminary trade agreement in early 2020, the tariffs remain in place as negotiations between the countries continue. The future of these tariffs, as well as the possibility for new tariffs, remains uncertain. Changes in U.S. and Chinese industrial policy also contribute to uncertainty regarding the global trade environment.

Other causes of uncertainty include the effects of sanctions and other actions taken against Russia because Russia invaded Ukraine. While we do not today have business with Russian partners or end users, the effect of

these sanctions on global trade and macroeconomic conditions generally—such as increases in the cost of energy and inflation—could nevertheless negatively affect our business.

We are subject to risks inherent in operating abroad and may not be able to successfully maintain or expand our international operations.

In 2022, we derived 83% of our total revenue from sales outside the United States. We anticipate growing our business, in part, by growing our international operations, which presents a variety of risks, including:

- changes, some unexpected or unanticipated, in regulatory requirements, taxes, trade laws, tariffs, export quotas, custom duties or other trade restrictions;
- lack of established, clear, or fairly implemented standards or regulations with which our products must comply;
- greater difficulty in enforcing contracts, judgments and arbitration awards in international courts, and in collecting accounts receivable as well as longer payment and collection periods;
- limited or unfavorable intellectual property protection;
- misappropriation of our intellectual property;
- inflation and fluctuations in foreign currency exchange rates and interest rates;
- restrictions, or changes thereof, on foreign trade or investment, including currency-exchange controls, including as a result of sanctions against Russia as a result of Russia invading Ukraine;
- changes in a country's or region's political, regulatory, legal or economic conditions, including, for example, global and regional economic disruptions caused by Covid-19;
- political, social and economic instability abroad; wars and other armed conflicts; and terrorist attacks and security concerns in general, including Russia invading Ukraine and China threatening Taiwan;
- differing regulations with regard to maintaining operations, products and public information;
- inequities or difficulties obtaining or maintaining export and import licenses;
- differing labor regulations, including where labor laws may be more advantageous to employees than in the United States;
- restrictions on earnings repatriation;
- corrupt or unethical practices in foreign jurisdictions that may subject us to exposure under applicable anti-corruption and anti-bribery laws such as the U.S. Foreign Corrupt Practices Act of 1977, as amended, or FCPA, and the United Kingdom Bribery Act of 2010, or U.K. Bribery Act; and
- regulations, and changes thereof, relating to data privacy, cybersecurity and the unauthorized use of, or access to, commercial and personal information, particularly in Europe.

We are subject to governmental export and import controls that could subject us to liability or impair our ability to compete in international markets.

We must export and import our products in compliance with U.S. export controls, including the Commerce Department's Export Administration Regulations and economic and trade sanctions established by the Treasury Department's Office of Foreign Assets Controls, as well as similar controls established in the countries in which we do business. For example, the U.S. Commerce Department recently issued rules regarding semiconductor- and supercomputer-related products and restrictions against sending certain chips and chip-related technology and software to China without an export license. In addition, after Russia invaded Ukraine, the United States and other countries imposed economic sanctions and export control restrictions against Russia and Belarus, as well as against certain Russian nationals and entities. We must undertake additional diligence efforts to comply with these rules, which may be time-consuming and result in delayed or lost opportunities. We may not always be successful in obtaining necessary export or import licenses, and our failure to obtain required export or import approval for our

products or limitations on our ability to export or sell our products may harm our domestic and international sales and negatively affect our revenue.

The U.S. government has imposed tariffs on a variety of items imported from China. China has responded by imposing tariffs on a variety of items imported from the United States. Such tariffs could have a material impact on our product costs and decrease our ability to sell our products to existing or potential customers as well as harm our ability to compete internationally. Any changes in our product or in export or import regulations or legislation; shift or change in enforcement; or change in the countries, persons or technologies targeted by these regulations could delay us introducing new products in international markets, decrease use of our products by, or decrease our ability to export or sell our products to, existing or potential customers with international operations, adversely affecting our business and results of operations.

Instability or deterioration in the political, social, business or economic conditions in key production jurisdictions could harm our supply of products.

Deterioration in the political, social, business or economic conditions in any jurisdictions in which we have significant suppliers could slow or halt product shipments or disrupt our ability to manufacture, test or post-process our products. We outsource our manufacturing and production to suppliers in a small number of Asian jurisdictions including Thailand, Malaysia, Taiwan and China. Some of these jurisdictions have experienced, and may continue experiencing, intermittent or sustained mandatory shutdowns or other restrictions to combat the spread of Covid-19. These jurisdictions have also experienced significant changes in political, social, business or economic conditions in the past and may experience them in the future.

We could be forced to transfer our manufacturing, testing and post-processing activities to more stable, and potentially more costly, regions or find alternative suppliers.

We source a significant portion of our wafers from suppliers in Taiwan, and our supply of wafers and other critical components may be materially and adversely affected by diplomatic, geopolitical and other developments between China and Taiwan. Notably, China has refused to renounce the use of military force against Taiwan, and there can be no assurance that relations between China and Taiwan will not deteriorate further, particularly in light of ongoing tensions between the United States and China. Any such developments could materially and adversely affect our business, financial condition and results of operations.

Our business operations could be disrupted by natural disasters.

In addition to the pandemic risk discussed earlier under “—Covid-19 has adversely affected our business, and the magnitude and duration of future Covid-19 effects on our business are uncertain,” other disasters, whether natural or manmade, could decrease demand for our products, disable our facilities, disrupt operations or cause catastrophic losses. We have facilities in areas with known seismic activity, such as our headquarters in Seattle, Washington. We have facilities in areas with known flooding, such as our office in Shanghai, China. We have a wafer testing and dicing subcontractor in Thailand, a region with a known, and recent, history of flooding. A loss at any of these or other of our or our suppliers’ facilities could disrupt operations, delay production and shipments, reduce revenue and engender potentially large expenses to repair or replace the facility. We do not carry insurance covering potential losses caused by pandemics, earthquakes, floods or other disasters.

Risks Relating to Our Relationships with Partners and End Users

We rely on a small number of customers for a large share of our revenue.

We sell our endpoint ICs directly to inlay and tag OEMs and ODMs. We sell our reader ICs to OEMs and ODMs, and our readers and gateways to solution providers, VARs and SIs, all primarily through distribution. If we fail to retain our endpoint IC, reader IC, reader or gateway partners or distributors or fail to establish relationships with new partners, then our business, financial condition or operating results could be harmed.

In 2022, sales to tag OEMs Avery Dennison and Arizon accounted for 28% and 10% of our total revenue, respectively. Sales concentration to a small number of OEMs decreases our bargaining power and increases the risk that our pricing or sales could decline based on actions taken by our competitors or our own failure to compete effectively.

Our competitors’ relationships with, or acquisitions of, these partners or distributors could interfere with our relationships with them. Any such interference could impair or delay our product sales or increase our cost of sales.

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We engage directly with end users to adopt our products in large projects. These projects, often involving large purchases of our readers and gateways, are often discrete deployments that can result in significant sales for periods of time. They also increase the volatility of our revenue and operating results. If we are unable to replace project-based revenue with new revenue streams, or if end users with large projects change or delay them without giving us with adequate notice, then our sales could decline from period to period and harm our stock price.

Our ability to affect or determine end-user demand is limited in part because we sell and fulfill primarily through partners and rarely directly to end users.

End users drive demand for our products but because we sell our products primarily through partners, we are one step removed from those end users and often unable to directly assess and affect their demand. Our partners may choose to prioritize selling our competitors' products over ours, or they may offer products that compete with our products or limit sales of our products. If our partners do not sell enough of our products or if they choose to decrease their inventories of our products, then our sales to those partners and our revenue will decline.

Our partners may not properly forecast end users' demand for our products.

Our partners may purchase more of our products than they need to satisfy end-user demand, increasing their inventory and reducing our future sales to them. Distributors may, subject to time and quality limitations, return products in exchange for other products. Our reserves estimates for products stocked by our distributors are based primarily on reports provided to us by those distributors, typically monthly. If the inventory and resale information our partners and distributors provide is inaccurate, or if we do not receive it in a timely manner, then we may not have a reliable view of products being sold to end users which could negatively impact our operating results.

Our growth strategy depends in part on the success of strategic relationships with third parties and their continued performance and alignment.

We invest in relationships with solution providers, SIs, VARs and software providers whose product and/or solution offerings complement ours and through which we often fulfill our product sales. Our business will be harmed if we fail to develop and grow these partner relationships. For example, our operating results may suffer if our efforts developing partner relationships increase our costs but do not increase revenue. Partner relationships may also include exclusivity provisions, multiple levels of distribution, discounted pricing or investments in other companies. The cost of developing and maintaining these partner relationships may go unrecovered and our efforts may not generate a corresponding revenue increase.

If we fail to maintain or enhance our brand recognition or reputation on which our business depends, then our business could be harmed.

We believe that building our brand and reputation is key to our relationships with partners and end users and our ability to attract new partners and end users. We also believe that our brand and reputation will be increasingly important as market competition increases. Our success depends on a range of factors, including:

- continuing to deliver high-quality, innovative and defect-free products;
- maintaining high partner and end user satisfaction;
- successfully differentiating our products from those of our competitors; and
- appropriately managing both positive and negative publicity.

Product supply shortages have challenged our ability to meet market needs and we have recently increased prices in response to our suppliers increasing their prices to us. Our inability to supply partners and end users with products they need, and/or our need to increase our prices could result in long-lasting, negative consequences to our relationships with those partners and end users, to RAIN adoption and to our business overall.

Increasing attention to environmental, social and governance matters may cause us to incur additional costs or expose us to additional risks.

Investors, governmental and nongovernmental organizations, partners and end users are increasingly focusing on environmental, social and governance, or ESG, practices. Our ESG practices may not meet their standards, and they as well as advocacy groups may campaign for us to change our business or practices to address their ESG-related concerns. A failure, or perceived failure, of us to respond to any such campaigns could harm our business and reputation and negatively impact the market price of our securities. Moreover, with the continued

evolution of ESG practices and reporting and disclosure requirements, our costs related to those ESG practices and reporting and disclosure requirements could increase, which could negatively affect our operating results.

Risks Relating to Our Intellectual Property

If we are unable to protect our intellectual property, then our business could be adversely affected.

Our success depends in part upon our ability to obtain, maintain and enforce our patents, copyrights, trade secrets, trademarks and other intellectual property rights and prevent third parties from infringing, misappropriating or circumventing those rights. We have historically focused on filing U.S. patent applications, for many reasons, including the fact that most RAIN products are used in or imported into the United States. We have only a small number of foreign patent applications or foreign patents. We also only have registered trademarks and domain names in select countries where we believe filing for such protection is appropriate. By focusing our intellectual property protection on the United States and a small number of foreign countries, we have limited ability to assert that intellectual property outside the United States, including in some significant foreign markets such as China.

We cannot guarantee that:

- any of the patents, trademarks, copyrights, trade secrets or other intellectual property rights we presently employ in our business will not lapse or be invalidated, circumvented, challenged or abandoned;
- our intellectual property rights will provide competitive advantages to us;
- our ability to assert our intellectual property rights against potential competitors or to settle current or future disputes will not be limited by our agreements with third parties;
- any of our pending or future patent applications will be issued or have the coverage we originally sought;
- our intellectual property rights can or will be enforced, particularly in jurisdictions where competition may be intense or where legal protections may be weak;
- we will not lose the ability to assert our intellectual property rights against, or to license our technology to, others and collect royalties or other payments; or
- we will retain the right to ask for a royalty-bearing license to an industry standard if we fail to file an intellectual property declaration pursuant to the standards process.

Monitoring and addressing unauthorized use of our intellectual property is difficult and costly, and litigation to enforce our intellectual property rights is time consuming, distracting, expensive and uncertain. Our failure to identify unauthorized use of, or otherwise adequately protect our intellectual property could adversely affect our business.

We may become party to intellectual property disputes which could be time consuming, costly to prosecute, defend or settle, result in the loss of significant rights, and adversely affect RAIN adoption or adoption of our products or platform.

We are engaged in several patent infringement lawsuits against NXP USA, Inc., a Delaware corporation, and certain of its affiliates. For further information regarding this litigation, please refer to Note 11 of our consolidated financial statements included elsewhere in this report. Our litigation with NXP will increase our expenses, distract management and key employees and could negatively impact our relationships with partners or end users. If we are unsuccessful in prosecuting our patent-infringement claims against NXP or in defending ourselves against NXP's counterclaims, or to the extent we cannot maintain the validity and enforceability of our patents, then we could see a material adverse effect on our business, results of operations or financial condition.

We may or may not prevail in patent-related proceedings given the complexity and inherent uncertainties in patent litigation. If any pending or future proceedings result in an adverse outcome, then we could be required to:

- cease manufacturing, using or selling the infringing products, processes or technology;
- pay substantial damages for infringement;
- expend significant resources to develop noninfringing products, processes or technology;

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- license technology from the party claiming infringement, which license may not be available on commercially reasonable terms, or at all;
- cross-license our technology to a competitor to resolve an infringement claim, which could weaken our ability to compete with that competitor; or
- pay substantial damages to our partners or end users for them to discontinue using, or replace, infringing products with noninfringing products.

Many companies in our industry, as well as nonpracticing entities, hold patents and other intellectual property rights and may pursue, protect and enforce those intellectual property rights. We receive invitations to license patent and other intellectual property rights to technologies that could be important to our business. We also receive assertions against us, our partners and end users claiming we or they infringe patent or other intellectual property rights. If we decline to accept an invitation to license or to refute an asserted claim, then the offering or claiming party may pursue litigation against us.

Intellectual property disputes have adversely affected RAIN adoption in the past. As one example, in 2011 Round Rock Research filed lawsuits against 11 end users, including Walmart and Macy's, for RAIN-related patent infringement. Despite the subsequent availability of an industry-wide license, we believe those lawsuits adversely affected demand for our products from 2011 to 2019. The licensed Round Rock patents expired in 2019. However, we, our partners, suppliers or end users could be involved in similar disputes in the future which could adversely affect our operating results and growth prospects.

Many of our agreements require us to indemnify and defend partners and end users from third-party infringement claims and pay damages in the case of adverse rulings. These damages could be sizable and disproportionate to the business we derive from those partners or end users. Moreover, we may not know whether we are infringing a third party's rights due to the large number of RAIN-related patents or to other systemic factors. For example, patent applications in the United States are maintained in confidence for up to 18 months after filing or, in some instances, for the entire time prior to patent issuance. Consequently, we may not be able to account for such rights until after a patent issues.

Intellectual property policies of industry standards organizations in whose working groups we participate could require us to provide royalty-free licenses of some of our intellectual property.

When participating in GS1, ISO, RAIN and other industry-standards organizations, it is a general policy that those who participate in developing a protocol or standard must license, either royalty-free or under reasonable and nondiscriminatory, or RAND, terms, intellectual property that is necessary to implement all or part of the protocol or standard. The standards body may require that the license be granted to members, as in the case of GS1, or to all parties, as in the case of ISO, that implement the protocol or standard.

As a participant in developing GS1 EPCglobal UHF Gen2, UHF Gen2 V2, tag data standards, low-level reader protocol and other GS1 EPCglobal protocols, we agreed to license to other GS1 EPCglobal members, on a royalty-free basis, those of our patents necessary to practice those protocols, subject to us receiving reciprocal royalty-free rights from the other GS1 EPCglobal member practicing the protocol. As a participant in developing ISO standards, we agreed to license on a RAND basis those of our patents necessary to practice those standards, subject to us receiving a reciprocal RAND license from the other entity practicing the standard.

Although the policies themselves seek to advance protocol or standards development, disputes can arise because it may not be clear whether certain intellectual property is necessary to practice a protocol or standard. Such uncertainty could complicate us asserting our not-necessary patents against others, or to use those patents in our own defense, thereby devaluing our intellectual property. Further, some GS1 EPCglobal members declined to license their intellectual property on royalty-free terms, instead retaining the right to license their technology on RAND terms. These members may choose to assert their intellectual property, in which case we will need to defend ourselves within the confines of the GS1 and ISO intellectual property policies.

We rely on third-party license agreements which, if impaired or terminated, could cause production or shipment delays that could harm our business.

We have license agreements with third parties for patents, software and technology we use in our operations and in our products. For example, we license tools from design-automation software vendors to design our silicon

ICs. Third-party licenses for patents, software and other technology important to our business may not continue to be available on commercially reasonable terms or may not be available at all. Loss of any such licenses could cause manufacturing interruptions or delays or reductions in product shipments until we can develop, license, integrate and deploy alternative technologies, if even possible, which could harm our business and operating results.

Our use of open-source software may expose us to additional risks and weaken our intellectual property rights.

Our products, processes and technology sometimes use or incorporate software that is subject to an open-source license. Certain open-source licenses require a user who intends to distribute the open-source software as a component of the user's software to disclose publicly part or all of the user's source code. In addition, certain open-source software licenses require the user of such software to make derivative works of the open-source software available to others at low or no cost. In addition, open-source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of their code, opening us to business risks that could materially harm our operating results.

We cannot guarantee that we have incorporated open-source software in a manner that is consistent with our policies and procedures relative to such open-source software, or in a manner that will not subject us to liability.

Risks Relating to Privacy and Cybersecurity

Privacy and security concerns relating to RAIN could damage our reputation and deter current or potential customers from using our products.

Privacy advocates and others have raised and may continue raising concerns about RAIN compromising consumer privacy or facilitating theft. These concerns include unauthorized parties potentially collecting personal information or personal data, tracking consumers, stealing identities or causing other issues relating to privacy or data protection. Any such incident could cause our or our partners' or end users' operations to be disrupted and subject us or them to regulatory investigations or proceedings and claims, demands or litigation; consequently, we could face potential liability and significant costs and expenses to remediate or otherwise respond to the incident. Any failure or perceived failure to comply with any privacy- or security-related laws, regulations or contractual or other obligations to which we are or may be subject may result in regulatory actions, claims or litigation; legal and other costs; substantial time and resources; and fines, penalties or other liabilities. Any actions or concerns about security and privacy may be expensive to defend, cause us to expend substantial time and resources and damage our reputation and operating results or could negatively impact overall RAIN industry development, even if unfounded.

We cannot be sure that any limitation-of-liability provisions in our customer and user agreements, contracts with third-party vendors and service providers or other contracts are enforceable or adequate or would protect us from any liabilities or damages against claims relating to a security breach or other privacy- or security-related issue.

Government regulations and guidelines and other standards relating to consumer privacy may adversely impact adoption of our products, require us to make design changes or constrain our ability to implement new and desired product features, and actual or alleged violations of laws relating to privacy or information security may result in claims, proceedings and liability.

Our partners and end users are subject to laws and regulations related to collecting, storing, transmitting and using personal information and personal data, as well as to additional laws and regulations that address privacy and security related to RFID in general. Because RAIN is a type of RFID, we believe these laws and regulations apply to RAIN.

The European Commission, or the EC, has issued guidance to address privacy concerns about RFID. In May, 2009 the EC issued a recommendation that retailers in the EU inform their customers when RFID tags are either on or embedded within products. In April 2011 the EC signed a voluntary agreement with private and public entities to develop privacy guidelines for companies using RFID in the EU. Whereas compliance is voluntary, our partners and end users that do business in the EU prefer products that comply with the guidelines. If our products do not comply or enable compliance with the guidelines, then our business may suffer.

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More generally, the data security and privacy legislative and regulatory landscape in the United States, EU and other jurisdictions continues evolving. Aspects of key privacy laws and regulations—including the California Consumer Privacy Act of 2018, the California Privacy Rights Act and the General Data Protection Regulation—remain unclear as of the date of this report and continue evolving, potentially with far-reaching implications. Laws and regulations relating to privacy, data protection and security; related industry standards and guidelines; and continued evolution of these laws, regulations, standards, guidelines and other actual and asserted obligations, as well as their interpretation and enforcement, may require us to modify our products, practices and policies, which we may not be able to do on commercially reasonable terms or at all, and otherwise could cause us to incur substantial costs and expenses. Any failure or perceived failure by us or any third parties with which we do business to comply with these laws and regulations or other actual or asserted obligations may result in claims or litigation; actions against us by governmental entities; legal and other costs; substantial time and resources and fines, penalties or other liabilities. Any such actions may be expensive to defend, may incur substantial legal and other costs and substantial time and resources and likely would damage our reputation and adversely affect our business, financial condition and results of operations.

Additionally, if we fail to develop products that meet end-user privacy requirements, then end users may choose not to use our products.

Although the Gen2 V2 protocol includes features for addressing consumer privacy and authenticating a tag, and although we have incorporated custom features in our products to further protect consumer privacy, a third party may still breach these features, including as implemented in our products, in which case our reputation could be damaged and our business and prospects could suffer.

A breach of security or other security incident impacting our systems or others used in our business could have an adverse effect on our business.

We face risks of security breaches and incidents from a variety of sources including viruses, ransomware, hacking, malicious code, supply-chain attacks as well as social engineering or other employee or contractor negligence, malfeasance or unintentional acts. Accidental or willful security breaches or incidents, or unauthorized access to our facilities or information systems, or to others used in our business, could compromise the security of those facilities or information systems and the confidentiality, integrity and availability of confidential, personal or proprietary information.

The consequences of loss, misuse, corruption or other unauthorized processing of confidential, personal or proprietary information could include, among other things, unfavorable publicity, reputational damage, difficulty marketing or selling our products, customer allegations of breach of contract, loss or theft of intellectual property, claims and litigation, governmental and regulatory investigations and other proceedings and fines, penalties and other damages and liabilities. Any of these consequences could have a material adverse effect on our business, financial condition, reputation and business relationships.

We rely on third-party services to store and process data on our behalf, and on third-party security systems in a variety of applications. Our platform operates in conjunction with, and depends on, third-party products, services and components for security. The cybersecurity threat environment continues to evolve considering the increase in remote work and heightened activity by state-sponsored actors. If we, our platform, or any of the third parties on which we rely suffers a security breach or incident, vulnerability, error, ransomware or malicious event, then we could face increased costs, claims, liability, reduced revenue and harm to our reputation.

We incur significant costs to detect and prevent security breaches and other security-related incidents. In the event of an actual or perceived security breach or incident we may need to expend significant resources to mitigate, notify third parties of, and otherwise address the breach or incident, its root cause and take steps to prevent further breaches or incidents. Our insurance may not adequately cover claims relating to an actual or perceived security breach or incident and any breach or incident may increase our insurance costs as well as reduce or eliminate the future availability of such insurance, harming our business and reputation.

Risks Relating to Our Financial Position and Capital Needs

We have a history of losses and have only achieved profitability intermittently. We cannot be certain that we will attain or sustain profitability in the future.

We have incurred losses since our inception in 2000. Whereas we were profitable between 2013 and 2015, we had a net loss of \$24.3 million for the year ended December 31, 2022, and an accumulated deficit of \$386.8 million as of December 31, 2022. Our ability to attain or sustain profitability depends on numerous factors, many of which are out of our control, including continued RAIN industry adoption and us maintaining or growing our market share. Our costs to support operations, product development and business and personnel expansion in sales, engineering and marketing are significant and are likely to increase as we invest to grow the market and our share of it, reduce our costs and improve our operations. If we fail to increase our revenue or manage our expenses, or if our investments in growing the market or our share of it fail, then we may not attain or sustain profitability.

We have a history of significant fluctuations in our quarterly and annual operating results.

Our history shows significant sales volatility and a limited ability to forecast sales. We anticipate that, for the foreseeable future, our visibility to future sales, including volumes and prices, will continue to be limited. That limited visibility may cause fluctuations in our operating results and differences between actual and expected quarterly or annual operating results.

Many factors, some outside our control, may cause or contribute to fluctuations in our quarterly and annual operating results. These fluctuations make financial planning and forecasting difficult. These fluctuations may also cause unanticipated decreases in our available cash, which could negatively affect our business and prospects. Material factors that contribute to fluctuations in our operating results include:

- macroeconomic conditions, including inflation and recession, and their impact on our business and that of our suppliers, partners and end users;
- fluctuations or delays in RAIN adoption and deployment by end users;
- fluctuations in demand for our products or platform, including by tag OEMs and other significant partners and end users on whom we rely for a substantial portion of our revenue;
- fluctuations in the pricing and availability or supply of our products or key elements or components of those products, especially semiconductor wafers;
- degradations in product quality, whether due to us or our suppliers, including quality claims or product returns;
- delays in new-product introductions and in the maturity of our new-product technologies;
- decreases in selling prices for our products;
- delays in our product-shipment timing, customer or end-user sales or deployment cycles, or work performed under development contracts;
- intellectual property disputes involving us, our partners, end users or other participants in our industry;
- adverse outcomes of litigation or governmental proceedings;
- timing variability in product introductions, enhancements, services and technologies by us and our competitors as well as market acceptance of new or enhanced products, services and technologies;
- unanticipated excess or obsolete inventory as a result of supply-chain mismanagement, new-product introduction, quality issues or otherwise;
- changes in the amount and timing of our operating costs, including those related to expanding our business, operations and infrastructure;
- changes in business cycles or seasonal fluctuations that affect the markets in which we sell;
- changes in industry standards or specifications, or changes in government regulations, relating to our products or our platform;

- late, delayed or cancelled payments from our partners or end users; and
- unanticipated impairment of long-lived assets and goodwill.

A substantial portion of our operating expenses are fixed in the short term, and as a result, fluctuations in revenue or unanticipated expenses can have a material and immediate impact on our profitability and negatively affect our operating results, which could cause the price of our common stock to decline.

We may need to raise additional capital which may not be available on favorable terms or at all.

In the future we may raise capital, including pursuant to a shelf registration statement filed with the SEC, potentially diluting our stockholders, restricting our operations or otherwise adversely affecting our business.

Debt financing, if available, may include covenants limiting or restricting our ability to take specific actions such as incurring additional debt, expending capital or declaring dividends, or may impose financial covenants that limit our ability to achieve our business objectives.

Our management has broad discretion in how to invest and spend our cash and cash equivalents and the proceeds from financings, including on capital expenditures, product development, working capital and other general corporate purposes. We may spend our cash and cash equivalents in ways that our stockholders may not agree with or that do not yield favorable returns.

If we need additional capital but cannot raise it on acceptable terms, if at all, then we may not be able to meet our business objectives, financial obligations or both. If we raise additional capital but do not deploy it effectively then our business, financial condition, results of operations and prospects could be harmed and the market price of our common stock could suffer.

Risks Relating to U.S. Federal Income Tax

Our ability to use net operating losses to offset future taxable income may be limited.

As of December 31, 2022, we had federal net operating loss carryforwards, or NOLs, of \$249.3 million and federal research and development credit carryforwards of \$22.3 million, which we may use to reduce future taxable income or offset income taxes. We have established a valuation allowance against the carrying value of these deferred tax assets. The NOL and federal research and development credit carryforwards began expiring in 2020.

Under Sections 382 and 383 of the U.S. Internal Revenue Code, or the Code, a corporation that experiences a more-than 50% ownership change by one or more stockholders or groups of stockholders who own at least 5% of a company's stock over a three-year testing period is limited in its ability to use its pre-change NOLs and other tax assets to offset future taxable income or income taxes. If we undergo a future ownership change then our ability to use our NOLs and credit carryforwards could be limited by Sections 382 and 383 of the Code. Our NOLs may also be limited under state law. As a result of these limitations, we may not be able to utilize a material portion of, or possibly any of, the NOLs and credit carryforwards to offset future taxable income or income taxes.

We could be subject to additional income tax liabilities.

We are subject to income taxes in the United States and certain foreign jurisdictions. During the ordinary course of business, we use significant judgment in evaluating our worldwide income-tax obligations and we conduct many transactions for which the ultimate tax determination is uncertain. Although we believe our tax determinations are proper, the final determination of any tax audits and any possible litigation could be materially different from our historical income-tax provisions and accruals. The results of an audit or litigation could have a material effect on our operating results or cash flows in the period or periods for which that determination is made.

Changes in tax laws could have a material adverse effect on our business, cash flow, results of operations or financial conditions.

We are subject to tax laws, regulations and policies of several taxing jurisdictions. Changes in tax laws, as well as other factors, could cause us to experience fluctuations in our tax obligations and effective tax rates and otherwise adversely affect our tax positions and/or our tax liabilities. For example, in August 2022 the United States enacted a 1% excise tax on stock buybacks and a 15% alternative minimum tax on adjusted financial statement income as part of the Inflation Reduction Act of 2022.

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The U.S. CHIPS and Science Act, enacted August 9, 2022, provides tax credits for semiconductor manufacturing activities within the United States, but because we outsource our semiconductor manufacturing we do not expect to be entitled to these tax credits.

Many countries, as well as organizations such as the Organization for Economic Cooperation and Development, have proposed changes to existing tax laws, including a proposed 15% global minimum tax. Any of these developments or changes in federal, state or international tax laws or tax rulings could adversely affect our effective tax rate and our operating results. There can be no assurance that our effective tax rates, tax payments or tax credits and incentives will not be adversely affected by these or other developments or changes in law.

Taxing authorities may successfully assert that we should have collected or in the future should collect sales and use, value-added or similar taxes.

We do not collect sales and use, value-added or similar taxes in all jurisdictions in which we have sales, based on our belief that such taxes are either not applicable or an exemption from such taxes applies. Certain jurisdictions may assert that such taxes are applicable, which could result in tax assessments, penalties and interest, and we may be required to collect such taxes in the future, including as a result of a change in law. Such tax assessments, penalties and interest or future requirements may negatively affect our operating results.

Risks Relating to Our Financial Reporting and Disclosure

Any failure to maintain an effective system of disclosure and internal controls over financial reporting, or our ability to produce timely and accurate financial statements, could adversely affect investor confidence in us.

As a public company, we must maintain effective disclosure controls and procedures and internal control over financial reporting. Effective internal controls are necessary for us to provide reliable financial reports and prevent fraud.

Any failure to implement and maintain effective disclosure controls and procedures and internal control over financial reporting, including identifying material weaknesses, could cause investors to lose confidence in the accuracy and completeness of our financial statements and reports, which could adversely affect the market price of our common stock. We could also be subject to sanctions or investigations by The Nasdaq Stock Market, the SEC and other regulatory authorities.

We have incurred, and in the future will incur, high costs associated with being a public company.

We have incurred significant legal, accounting and other costs associated with public-company reporting requirements. We ceased to be an “emerging growth company” on December 31, 2021, and are no longer eligible for the reduced disclosure requirements and exemptions applicable to “emerging growth companies.” Our loss of this status has required additional management attention and increased our costs, including legal, accounting and investor-relations-related costs. We cannot predict or accurately estimate the additional costs we are likely to incur from being a public company or the timing of these costs.

We have and will continue to incur costs associated with accepted corporate governance requirements, including those of the SEC and The Nasdaq Global Select Market. We expect those governance requirements to lead to ongoing legal and financial costs and make some activities more time consuming and costly. They may also increase the difficulty and expense for us to obtain director and officer liability insurance. Although we monitor developments with respect to those requirements, we cannot predict or accurately estimate the additional costs we are likely to incur or the timing of these costs.

Risks Relating to Owning or Trading Our Securities

The market price of our common stock has been and will likely continue to be volatile, and the value of your investment could decline significantly.

The trading price of our common stock has fluctuated and is likely to continue to fluctuate substantially. The following factors, in addition to general risks and other risks described in this report, may have a material effect on the trading price of our common stock:

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- price and volume fluctuations in the overall stock market;
- changes in operating performance, stock market valuations and volatility in the market prices of other technology companies generally, and of those in our industry in particular;
- actual or anticipated quarterly variations in our results of operations or those of our competitors;
- actual or anticipated changes in our growth rate relative to our competitors;
- delays in end-user deployments of RAIN solutions;
- announcements by us or our competitors of acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- supply interruptions, including semiconductor wafer or other product or component shortfalls;
- developments relating to intellectual property rights or in disputes relating to those rights;
- our ability to develop and market new and enhanced products on a timely basis;
- commencement of, or our involvement in, litigation;
- changes in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- unstable political and economic conditions, including instability resulting from wars and other armed conflicts, such as Russia invading Ukraine;
- the trading volume of our stock;
- actual or perceived security breaches;
- limited public float;
- any future sales of our common stock or other securities;
- financial analysts dropping or reducing their coverage of us; changes in financial estimates by analysts who do cover us; or our failure to meet analyst estimates or investor expectations;
- fluctuations in the values of companies that investors perceive to be comparable to us;
- the financial projections we may provide to the public, as well as any changes in those projections or our failure to meet those projections; and
- general economic conditions and slow or negative growth in the markets in which we operate.

Technology stocks like ours have experienced extreme price and volume fluctuations, often unrelated or disproportionate to the company's underlying operating performance. Stock price volatility can cause stockholders to institute securities class-action litigation or stockholder derivative litigation, as occurred to us between 2018 and 2020. If any of our stockholders were to bring a lawsuit against us, the defense and disposition of the lawsuit could be costly and divert the time and attention of our management, harm our operating results and negatively impact the trading price of our common stock.

Transactions relating to the 2021 Notes may affect our stock's value.

If the 2021 Notes are converted by holders, then we are entitled to deliver cash, stock or any combination of cash or stock, at our election. If we elect to deliver stock, the ownership interests of our existing stockholders will be diluted, and public market sales of stock issued upon a conversion could decrease our stock price. Anticipated future conversions of the 2021 Notes into stock could also decrease our stock price, as could short selling by holders of the 2021 Notes to hedge their positions.

In December 2019, we issued convertible senior notes due December 15, 2026, or the 2019 Notes. When we did so we entered into privately negotiated capped-call transactions with financial counterparties to mitigate the dilutive impact on the Company above a given stock price. We left those capped-call transactions intact after we acquired the remainder of the outstanding 2019 Notes in June 2022. From time to time, the financial counterparties

to the capped calls may modify their hedge positions by entering into or unwinding various derivative transactions involving our stock or by purchasing or selling our stock or other securities of ours in secondary market transactions prior to the maturity of the capped calls. This activity could cause a decrease in our stock price.

For more information on the 2019 Notes, the 2021 Notes and the capped-call transactions, see Note 6 of our consolidated financial statements included elsewhere in this report.

Our principal stockholders and management own a significant percentage of our stock and are able to exercise significant influence over matters subject to stockholder approval.

As of December 31, 2022, our executive officers, directors and principal stockholders, together with their respective affiliates, beneficially owned approximately 22.0% of our stock. As a result, our executive officers, directors and principal stockholders may be able to significantly influence, in their capacity as stockholders, matters requiring approval by our stockholders, including electing directors and approving mergers, acquisitions or other transactions. They may have interests that differ from yours and may vote in a way with which you disagree and which may be adverse to your interests. This ownership concentration could have the effect of delaying or preventing a change in our control or otherwise discouraging a potential acquirer from attempting to obtain control of us, which in turn could have a material adverse effect on our stock price. This ownership concentration could also prevent attempts by our stockholders to replace or remove our board of directors or management.

We may not have sufficient cash flow or access to cash necessary to satisfy our obligations under the 2021 Notes, and our current and future indebtedness may restrict our business.

Our ability to make scheduled payments of the principal of, to pay interest on or to refinance any current or future indebtedness, including the 2021 Notes, or to make cash payments in connection with any conversion of the 2021 Notes or upon any fundamental change if holders require us to repurchase their 2021 Notes for cash, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient future cash from operations to service our indebtedness and make necessary capital expenditures. If we are unable to generate sufficient cash flow, then we may be required to pursue other alternatives, such as selling assets, restructuring indebtedness or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance any of our indebtedness, including the 2021 Notes, will depend on the capital markets and our financial condition at that time. We may not be able to pursue these alternatives on favorable terms or at all, which could result in us defaulting on our debt obligations.

Our existing and future indebtedness could have important consequences to our stockholders and significant effects on our business. For example, it could:

- make it more difficult for us to satisfy our debt obligations, including the 2021 Notes;
- increase our vulnerability to general adverse economic and industry conditions;
- require us to dedicate a substantial portion of our cash flow from operations to payments on our indebtedness, thereby reducing the cash available to run our business;
- limit our flexibility in planning for, or reacting to, changes in our business or in our industry;
- restrict us from exploiting business opportunities;
- place us at a competitive disadvantage compared to our competitors that have less indebtedness; and
- limit our ability to borrow additional funds for working capital, capital expenditures, acquisitions, debt service requirements, executing our business strategy or for other purposes.

Anti-takeover provisions in our charter documents and under Delaware or Washington law could prevent, delay or impede an acquisition of us and constrain our stock price.

Provisions of our certificate of incorporation and our bylaws may delay or discourage transactions involving an actual or potential change in our control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares, or transactions that our stockholders might otherwise deem to be in their best interests. These provisions could therefore adversely affect our stock price. Among other things, our certificate of incorporation and bylaws:

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- permit our board of directors to issue up to 5,000,000 shares of preferred stock, with any rights, preferences and privileges as they may designate;
- provide that the authorized number of directors may be changed only by resolution of the board of directors;
- provide that all vacancies, including newly created directorships, may, except as otherwise required by law, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- divide our board of directors into three classes, each of which stands for election once every three years (subject to gradual declassification beginning at the 2021 annual meeting of stockholders, such that our board of directors will be fully declassified beginning at the 2023 annual meeting of stockholders);
- restrict the forum for certain litigation against us to Delaware;
- require that any action taken by our stockholders be effected at a duly called annual or special meeting of stockholders and not by written consent;
- provide that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide notice in writing in a timely manner, and also specify requirements as to the form and content of a stockholder's notice;
- do not provide for cumulative voting rights (therefore allowing the holders of a majority of the shares of common stock entitled to vote in any uncontested election of directors to elect all of the directors standing for election, if they should so choose); and
- provide that special meetings of our stockholders may be called only by the chair of the board, our chief executive officer or the board of directors.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which generally prohibits a Delaware corporation from engaging in any of a broad range of business combinations with any “interested” stockholder for a period of three years following the date on which the stockholder became an “interested” stockholder. Likewise, because our principal executive offices are located in Washington, the anti-takeover provisions of the Washington Business Corporation Act may apply to us under certain circumstances now or in the future. These provisions prohibit a “target corporation” from engaging in any of a broad range of business combinations with any stockholder constituting an “acquiring person” for a period of five years following the date on which the stockholder became an “acquiring person.”

Our bylaws include provisions that could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our bylaws provide that, unless we otherwise consent in writing, the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our certificate of incorporation or our bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. The choice of forum provision may limit stockholders' ability to bring a claim in a judicial forum favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

Item 1B. Unresolved Staff Comments

Not applicable.

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Item 2. Properties

We have several operating leases for office space, summarized as of December 31, 2022 in the table below. We believe that our facilities are adequate for our current needs.

<u>Location</u>	<u>Purpose</u>	<u>Approximate Square Feet</u>	<u>Principal Lease Expiration Dates</u>
Seattle, Washington	Corporate headquarters	109,000	2026
Seattle, Washington	Design laboratory	11,000	2024
Seattle, Washington	Design laboratory	29,000	2029
Shanghai, China	General office space	4,000	2023

In addition, we hold a lease for approximately 39,000 square feet of commercial office space in Seattle, Washington that expires in 2023. We have sublet the entirety of this office space through the expiration date. We also lease offices in Thailand and Malaysia. For more information about our lease commitments, please refer to Note 10 to our consolidated financial statements included elsewhere in this report.

Item 3. Legal Proceedings

In the normal course of business, we may be named as a party to various legal claims, actions and complaints. We cannot predict whether any resulting liability will have a material adverse effect on our financial position, results of operations, cash flows, market position or stock price.

Patent Litigation

On June 6, 2019, we filed a patent infringement lawsuit against a competitor, NXP, USA Inc., and on October 4, 2019, NXP USA, Inc. and its parent NXP Semiconductors N.V., filed a patent infringement lawsuit against us. Both we and NXP subsequently filed additional lawsuits against each other. The outcome of this patent litigation remains uncertain, and we may file additional lawsuits against NXP USA, Inc. and/or its parent or they may file additional lawsuits against us. For further information on these lawsuits, please refer to Note 11 of our consolidated financial statements included elsewhere in this report.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Information

Our common stock has traded on The Nasdaq Global Select Market under the symbol “PI” since July 21, 2016.

Holders of Record

As of February 3, 2023, there were 33 holders of record of our common stock. The actual number of holders is greater than the number of holders of record and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. The number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

Dividends

We have never declared or paid a cash dividend on our common stock. We currently intend to apply our available funds and any future earnings to developing and growing our business. We therefore do not anticipate paying any cash dividends on our common stock for the foreseeable future. In addition, future debt instruments, if any, may materially restrict our ability to pay dividends on our common stock. Any future determination to pay dividends on our common stock will depend at least on our results of operations, financial condition and liquidity requirements, restrictions that may be imposed by applicable law or by contracts, and any other factors that our board of directors may consider relevant.

Performance Graph

This performance graph shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), or incorporated by reference into any filing of Impinj, Inc. under

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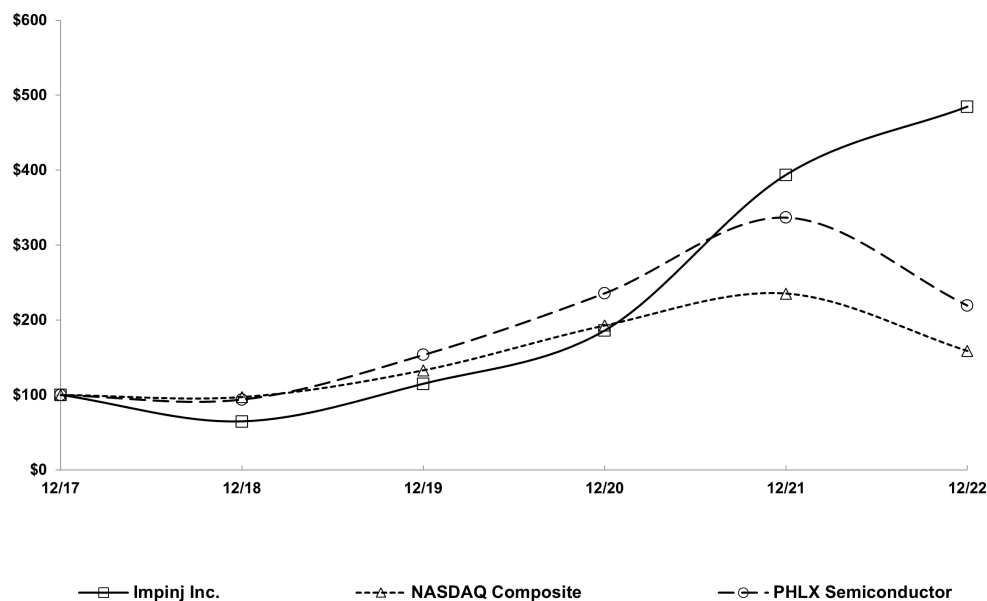
the Securities Act of 1933, as amended, or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

The following graph compares our cumulative total stockholder return on our common stock with the NASDAQ Composite Index and the Philadelphia Semiconductor Index.

This graph assumes that the investment in our common stock and in each index was \$100 on December 31, 2017, and assumes dividend reinvestment, if any. The stock price performance shown on the graph below is not indicative of future stock price performance.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*

Among Impinj Inc., the NASDAQ Composite Index
and the PHLX Semiconductor Index



*\$100 invested on 12/31/17 in stock or index, including reinvestment of dividends.
Fiscal year ending December 31.

Securities Authorized for Issuance Under Equity Compensation Plans

For more information on securities authorized for issuance under our equity compensation plans, see Note 8 and Note 9 of our consolidated financial statements included elsewhere in this report.

Item 6. [Reserved]

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

You should read the following discussion and analysis together with our consolidated financial statements and the related notes to those statements included elsewhere in this report. This discussion contains forward-looking statements that involve risks and uncertainties. As a result of many factors, such as those set forth under “Risk Factors” and elsewhere in this report, our actual results may differ materially from those anticipated in these forward-looking statements.

Overview

Our vision is a boundless Internet of Things, or IoT. We are driving a future in which everyday physical items are wirelessly connected to digital counterparts, or digital twins, in the cloud, and in which businesses and people access information about an item from its digital twin. Our mission is to connect every thing. We deliver a platform that powers item-to-cloud connectivity, and on which solution providers innovate IoT whole products.

Today, we deliver the identity, location and authenticity of billions of physical items. We believe our future is extending that delivery to trillions of physical items and enabling ubiquitous access to cloud-based digital twins of those items, each storing an item’s ownership, history and links. We believe the item connectivity that our platform will deliver enhances businesses efficiencies and commerce and, ultimately, improve peoples’ lives.

Our platform, which comprises multiple product families, wirelessly connects individual items and delivers data about the connected items to business and consumer applications. We link the products within our platform to deliver capabilities and performance that surpasses mix-and-match solutions built from competitor products.

We and our partners connect the items via a miniature radio chip embedded in the item or in its packaging, reading and delivering each item’s identity, location and authenticity. To date, we have enabled connectivity to more than 75 billion items, enabling businesses and consumers to derive timely information from those connected items.

Our platform uses RAIN, a type of radio-frequency identification, or RFID, technology we pioneered. We spearheaded development of the RAIN radio standard, lobbied governments to allocate frequency spectrum and cofounded the RAIN Alliance that today has more than 150 member companies. Our industry uses free spectrum in 81 countries encompassing roughly 95% of the world’s GDP. We believe RAIN’s capabilities – in particular, endpoint ICs with serialized identifiers for individual items, battery-free operation, 30-foot range, not line-of-sight readability, up to 1,000 reads per second, low cost, essentially unlimited life and available cryptographic authentication – position RAIN to be the leading item-to-cloud connectivity technology for the IoT.

Factors Affecting Our Performance

Inventory Supply

From time to time, we experience inventory overages or shortages, either due to us misestimating customer or end-user demand; insufficient manufacturing capacity or product availability; market fluctuations; competitive product availability; macroeconomic fluctuations; changes in regulations or tariffs; or for a host of other reasons. These inventory dynamics can impact some or all of our products. High inventory levels can increase expenses, cause product obsolescence and/or increase reserves, negatively affecting our business. Low inventory levels can cause lengthened lead times, missed opportunities, market-share loss and/or damaged customer relationships, also negatively affecting our business. For example, in 2021 and 2022 we experienced IC wafer shortages relative to our needs because of high worldwide demand for foundry capacity. These shortages prevented us from fully meeting customer demand and, in some cases, caused customers to cancel orders, qualify alternative suppliers or purchase from our competitors.

In 2020, during the Covid-19 economic downturn, we built endpoint IC inventory. Beginning in fourth-quarter 2020, demand for our endpoint ICs increased dramatically. Worldwide wafer demand also increased dramatically, leading to wafer shortfalls in many industries, including ours. In first-quarter 2021, we consumed the inventory we built in 2020 at a pace that exceeded our first-quarter 2021 supply and post-processing capacity. In the second and third quarters, we moderated our sales and inventory burndown, stretching our IC supply but constraining our ability to fully capitalize on the increasing endpoint IC demand, while we also expanded and

matured our post-processing capacity. Despite that moderation, by end of third-quarter 2021 we had mostly consumed our prebuilt inventory and demand for our endpoint ICs continued to exceed our ability to supply.

In 2022, wafer shortfalls in our process nodes continued, preventing us from fully capitalizing on our demand in every quarter of 2022. Although we did receive wafer upsides from our foundry partner that supported sequential increases in endpoint IC revenue each quarter, demand exceeded supply throughout the year. And because many of those upside wafers were 200mm rather than 300mm, we transitioned some customers back from our 300mm M700 family to our prior-generation 200mm Monza R6 product family, despite M700 being our primary market demand. In fourth-quarter 2022, our foundry partner signaled improving wafer supply. Regardless, we anticipate taking until at least second-half 2023 to begin building a sustainable level of endpoint IC finished goods inventory.

Throughout 2022 we were also unable to obtain enough reader components to meet reader market demand. Although component availability is starting to improve, some components remain stubbornly tight, and we expect that tightness to persist at least into first-half 2023. For reader ICs, we previously experienced long packaging lead times for our Indy reader ICs and testing delays for our new E-family reader ICs. The Indy lead times and E-family testing stabilized in second-half 2022.

In 2022 we saw cost increases for our endpoint IC wafers and for all systems products, which caused us to raise prices and potentially negatively impact our market competitiveness. Overall, the supply, packaging and test shortfalls, as well as cost increases, may decrease sales and cause market-share losses if our partners and end users buy competing products over ours, or choose to not deploy at all, negatively impacting our operating results and prospects.

Investing for Growth

We have invested in, and plan to continue investing in, research and development to enhance and extend our platform, including enhancing existing products, introducing new products and advancing the unique capabilities and features our platform enables. Although we sell our products into many end markets, relying significantly on our partner channel, we are today focusing particular attention on retail self-checkout and loss prevention and SC&L package tracking.

Most of our investments precede any sales benefits from the investments and, in some instances, we may never see any benefit if the market is not receptive to our approach, our product development is late or fails, or for other reasons. We sometimes enter into arrangements with end users, suppliers or partners for them to fund part of our investment, but even in those instances the investment results remain uncertain, and in some cases we may be required to refund the investment if the development is unsuccessful or the market opportunity fails to materialize. In some instances, we delay or cancel investments without or until we obtain such funding. The outcome of an investment is almost always uncertain, and if our results do not meet expectations then our operating results, profitability and stock price may be adversely affected.

While our long-term plan to invest for growth remains unchanged, Covid-19 and a weaker global economy has introduced new uncertainty to our business. We will continue to monitor the impacts of both on our supply chain, market and opportunities and adjust our investment strategy as appropriate.

Market Adoption

Our financial performance depends on the pace and scope of end-user adoption of our products in multiple industries, especially in retail apparel, which is our largest market. Covid-19 had a materially adverse impact on the retail industry, initially by shifting consumer shopping away from physical stores, then causing post-Covid supply shortfalls and retailer over-ordering and, in early 2023, inventory corrections at many retailers. Despite these retail macro trends, for the most part retail demand for our products exceeded our supply throughout 2022. Covid-19 also impacted other markets that use RAIN. For example, aviation, which had proposed widespread luggage tagging, saw delayed adoption. By contrast, SC&L experienced markedly increased shipment volumes which positively impacted adoption. Regardless, for the most part across all these industries, and for most of our products, demand exceeded supply throughout 2022.

Given the uncertainties in our market and product supply, the negative impacts of our insufficient 2022 supply and end user perceptions of the risks associated with insufficient supply, we cannot be certain that RAIN adoption will continue; that we will have appropriate product inventory; that we will not experience future product inventory shortfalls or overages; or that Covid-19 and a weaker global economy will not materially impact our

business going forward. We also cannot be certain we will be able to maintain or grow our market share for any of our products, whether because of insufficient inventory, Covid-19, competitors copying our products, insufficient wafer or other product supply, competition generally or for a host of other reasons, many of which are outside our control.

Regardless of the uneven pace of retail, SC&L and other industry adoption, we believe the underlying, long-term trend is continued RAIN adoption and we continue investing in new products. In our endpoint IC business, in 2020 we introduced the Impinj M700 family, with significant performance advantages over other endpoint ICs on the market. We continue expanding the M700 family, for example with our introduction of the M780 and M781 in November 2022. In our systems business, in 2020 we introduced the Impinj R700 reader and in 2021 our Impinj E-family reader ICs, both of which likewise offer significant performance advantages over other readers and reader ICs on the market and for which we continue expanding the product families. Regardless, market adoption could be impacted by product availability—see the discussion of product availability under “Inventory Supply”.

We sell our products primarily through partners and distributors and therefore have limited visibility to end-user demand. Consequently, we may incorrectly forecast that demand or not identify market shifts in a timely manner, potentially adversely affecting our business. If RAIN market adoption, and adoption of our products specifically, does not meet our expectations, or if we are unable to meet partner or end-user volume or performance expectations, because of the impact of Covid-19, supply-chain disruption, macroeconomic conditions or otherwise, then our operating results and growth prospects will be adversely affected. If we reduce prices to win opportunities, then our gross margins may be negatively affected. In contrast, if our endpoint IC, reader IC, reader or gateway sales exceed expectations, then our revenue and profitability may be positively affected.

Timing and Complexity of End User Deployments

From 2010 to 2022, our endpoint IC sales volumes increased at a compounded annual growth rate of 26%. However, the pace has been uneven and unpredictable. For example, our endpoint IC unit sales volumes increased significantly in 2016, declined in second-half 2017 and in first-half 2018, returned to growth in second-half 2018 and in 2019 (the latter albeit not at the same pace as in 2016), declined again in second- and third-quarter 2020 due to Covid-19, and recovered in fourth-quarter 2020, in 2021 and in 2022. We expect short-term demand to remain unpredictable in scope and timing. Longer term, we believe our endpoint IC opportunity will continue to grow, but we cannot predict whether historical annual growth rates are indicative of the pace of future growth.

Our systems business, at least for our readers and gateways, is impacted by large-scale deployments at discrete end users. The timing of those large deployments causes large variability in our systems revenue. For example, we generated 14% of total 2019 revenue from a large North American SC&L provider in connection with a project-based gateway deployment. We did not have comparable new project-based revenue in 2020. As another example, in second-quarter 2021, we generated 13% of our quarterly revenue from a project-based gateway deployment for RAIN-based self-checkout and loss prevention at a large European-based global retailer.

Finally, although we promote our platform as an integrated offering, we sell our products individually, and end users often use only certain of our products. For any given end-user solution, whether an end user chooses to deploy our entire platform or only a portion will also affect our operating results.

Average Selling Price

Our product ASPs fluctuate based on competitive pressures and the discounting we offer to win opportunities, but generally decline over time. Historically, we have been able to compensate these ASP declines by reducing the per-unit cost of most of our products, by reducing supplier costs and implementing manufacturing and quality improvements, as well as by introducing newer and lower-cost products, but the timing of these cost reductions and new-product introductions fluctuates and may not materialize in any given quarter or year. In second-half 2021, due to wafer and component supply shortfalls at many of our suppliers, we began experiencing increasing rather than decreasing costs for both endpoint ICs and systems. In 2022, we raised prices to offset the impact of those increased costs. Many of our vendors and subcontractors have signaled future price increases, including our wafer foundry partner. Such increases, if or when they occur, could cause us to pass the higher costs to our customers. If we are unable to successfully increase our prices or if our customers choose competitors' products due to our higher prices, then our product margins, operating results or both may suffer. In the near term, we expect product margins to be volatile based on product mix and the timing of our price changes.

Seasonality

We typically renegotiate pricing with most of our endpoint IC OEMs with an effective date of the first quarter of the calendar year, reducing revenue and gross margins in the first quarter compared to prior periods. Historically, the impact tends to decline in subsequent quarters as we reduce costs and, to the extent we can migrate our partners and end users to newer, lower-cost products, adjust product mix. Endpoint IC volumes also tend to be historically lower in the fourth quarter than in the third quarter. We did not see these historical trends in 2022 and may not see them in 2023.

System sales tend to be stronger in the fourth quarter of the calendar year, and less strong in the first quarter. We believe this seasonality is due to the availability of residual funding for capital expenditures prior to the end of many end users' fiscal years. Like for our endpoint ICs, we did not see these historical trends in 2022 and may not see them in 2023.

While, over the long term, we expect these seasonal trends to continue, quarter-to-quarter revenue variability from factors including supply uncertainty, deployment timing, competitor products and supply-chain disruptions can all mask seasonality in any given period. These variabilities, as well as other risks and uncertainties, including but not limited to the impacts of Covid-19, can cause our actual results to differ significantly from our expectations, as described in greater detail in the sections of this report captioned "—Covid-19" and in Part I, Item 1A (Risk Factors).

Covid-19

We are actively monitoring and mitigating the impacts of Covid-19 in all aspects of our business, including for our employees, suppliers, partners and end users.

In 2021 and 2022, as the worldwide economy began recovering from the downturn caused by Covid-19, demand for all our products increased. Unfortunately, at the same time, we experienced supply constraints and higher costs that limited our ability to fully capitalize on the increased demand, as discussed above.

Given the ongoing uncertainty over Covid-19's epidemiological, economic and operational impacts we cannot reasonably estimate the extent or duration of Covid-19's continuing impact on our business. The extent to which Covid-19 impacts our future results will depend on developments that are inherently unpredictable, including the emergence of new Covid-19 variants and actions we and others take in response to Covid-19.

For more information on Covid-19's impact on our business, please refer to Part I, Item 1A (Risk Factors) of this report.

Results of Operations

(in thousands, except percentages)	Year Ended December 31,			2022 vs 2021 Change	2021 vs 2020 Change
	2022	2021	2020		
Revenue	\$ 257,800	\$ 190,283	\$ 138,923	\$ 67,517	\$ 51,360
Gross profit	\$ 137,884	\$ 98,954	\$ 65,140	\$ 38,930	\$ 33,814
<i>Gross margin</i>	<i>53.5%</i>	<i>52.0%</i>	<i>46.9%</i>	<i>1.5%</i>	<i>5.1%</i>
Loss from operations	\$ (19,479)	\$ (37,249)	\$ (47,071)	\$ 17,770	\$ 9,822

Year ended December 31, 2022 compared with year ended December 31, 2021

Revenue and gross profit increased, due primarily to higher endpoint IC and systems revenue. The endpoint IC revenue increase was driven primarily by higher ASP and shipment volumes when compared to the prior year period. Gross margin increased, due primarily to increased product margins. The increased product margins were driven primarily by an increase in endpoint IC margins due to product mix. Loss from operations decreased, due primarily to increased gross profit offset by increased operating expenses. The operating-expense increase was due primarily to higher research and development, sales and marketing and general and administrative personnel costs; non-settlement-related legal fees; higher stock-based compensation expense; higher infrastructure costs; and higher marketing and advertising costs; offset by lower restructuring expenses.

Year ended December 31, 2021 compared with year ended December 31, 2020

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Revenue and gross profit increased, due primarily to higher endpoint IC and systems revenue. Gross margin increased, due primarily to 2020 excess and obsolescence charges as well as 2021 sales of fully reserved inventory and increased product margins. The increased product margins were driven primarily by an increase in endpoint IC margins due to product mix. Loss from operations decreased, due primarily to increased gross profit offset by increased operating expenses. The increase in operating expenses was due primarily to increased stock-based compensation expense; increased research and development and sales and marketing personnel expenses; and increased non-settlement-related legal fees.

Revenue

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Endpoint ICs	\$ 191,532	\$ 139,250	\$ 102,326	\$ 52,282	\$ 36,924
Systems	66,268	51,033	36,597	15,235	14,436
Total revenue	<u>\$ 257,800</u>	<u>\$ 190,283</u>	<u>\$ 138,923</u>	\$ 67,517	\$ 51,360

We currently derive substantially all our revenue from sales of endpoint ICs, reader ICs, readers and gateways. We sell our endpoint ICs primarily to inlay manufacturers; our reader ICs primarily to OEMs and ODMs through distributors; and our readers and gateways to solutions providers, VARs and SIs, also primarily through distributors. We expect endpoint IC sales to represent the majority of our revenue for the foreseeable future.

Year ended December 31, 2022 compared with year ended December 31, 2021

Endpoint IC revenue increased \$52.3 million, due primarily to a \$35.5 million increase from higher ASPs and a \$16.8 million increase from higher shipment volumes. The ASP increase was due primarily to price increases we implemented to offset higher product costs as discussed above under “—Factors Affecting Our Performance—Average Selling Price” and product mix, the latter from a higher contribution from industrial and specialty ICs.

Systems revenue increased \$15.2 million, due primarily to increases of \$7.6 million in reader IC revenue, \$4.9 million in gateway revenue and \$3.3 million in reader revenue offset by a decrease of \$913,000 in nonrecurring engineering, or NRE, revenue. The reader IC and gateway revenue increases were due primarily to higher shipment volumes; the reader revenue increase was due primarily to higher ASPs.

For more information, see the sections captioned “—Factors Affecting Our Performance—Inventory Supply” and “Shortages of silicon wafers and components used in our readers and gateways may adversely affect our ability to meet demand for our products and adversely affect our revenue and/or gross margins”.

Year ended December 31, 2021 compared with year ended December 31, 2020

Endpoint IC revenue increased \$36.9 million, due primarily to a \$44.5 million increase in shipment volumes, offset by a \$7.6 million decrease due to lower ASPs. The increase in shipment volumes was due, in part, to 2020 volumes being low, a result of Covid-19 which negatively impacted several markets we sell to, including retail, our largest endpoint IC market, as well as growth in our customers’ underlying business. The ASP decrease was due to our annual price negotiations as discussed above under “—Factors Affecting Our Performance—Seasonality” and product mix with a higher contribution from our M700 product line which has a lower ASP, both of which were slightly offset by higher contribution from industrial and specialized products.

Systems revenue increased \$14.4 million, due primarily to increases of \$12.2 million in reader revenue, \$1.4 million in gateway revenue and \$629,000 in NRE revenue. Reader revenue increased primarily due to higher shipment volumes and ASPs, gateway revenue increased primarily due to higher ASPs; and NRE revenue increased due to timing of revenue recognition.

Gross Profit and Gross Margin

(in thousands, except percentages)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Cost of revenue	\$ 119,916	\$ 91,329	\$ 73,783	\$ 28,587	\$ 17,546
Gross profit	137,884	98,954	65,140	38,930	33,814
Gross margin	53.5%	52.0%	46.9%	1.5%	5.1%

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Cost of revenue includes costs associated with manufacturing our endpoint ICs, reader ICs, readers and gateways, including direct materials and outsourced manufacturing costs as well as associated overhead costs such as logistics, quality control, planning and procurement. Cost of revenue also includes charges for excess and obsolescence and warranty costs. Our gross margin varies from period to period based on mix of endpoint IC and systems, underlying product margins driven by changes in ASPs or costs, as well as from inventory excess and obsolescence charges.

Year ended December 31, 2022 compared with year ended December 31, 2021

Cost of revenue increased \$28.6 million, due primarily to increased endpoint IC and systems revenue. Gross margin increased, due primarily to increased product margins, with fluctuations that offset one another related to reduced sales of fully reserved inventory and higher indirect costs. The product-margin increase was due primarily to higher endpoint IC margins from a higher revenue contribution from industrial and specialty ICs. Sales of fully reserved inventory had an immaterial gross margin impact for the year ended December 31, 2022, compared to a favorable gross margin impact of 1.5% for the year ended December 31, 2021.

Year ended December 31, 2021 compared with year ended December 31, 2020

Cost of revenue increased \$17.5 million, due primarily to increased endpoint IC and systems revenue. Gross margin increased 5.1%, due to inventory excess and obsolescence charges that had an unfavorable net gross margin impact of 2.2% in 2020, sales of fully reserved inventory that had a positive 1.5% impact in 2021, and increased underlying product margins primarily related to favorable endpoint IC product mix with an increasing mix of M700 and higher contribution from industrial and specialty ICs.

Operating Expenses

Research and Development

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Research and development	\$ 74,106	\$ 64,058	\$ 48,590	\$ 10,048	\$ 15,468

Research and development expense comprises primarily personnel expenses (salaries, benefits and other employee related costs) and stock-based compensation expense for our product-development personnel; product development costs which include external consulting and service costs, prototype materials and other new-product development costs; and an allocated portion of infrastructure costs which include occupancy, depreciation and software costs. We expect research and development expense to increase in absolute dollars in future periods as we focus on new product development and introductions.

Year ended December 31, 2022 compared with year ended December 31, 2021

Research and development expense increased \$10.0 million, due primarily to increases of \$6.6 million in personnel expenses from higher headcount and a change in bonus payment structure from 100% PSUs to 50% cash and 50% PSUs, \$1.9 million in infrastructure costs primarily from increased software costs, and \$793,000 in stock-based compensation expense related primarily to increased outstanding equity grants.

Year ended December 31, 2021 compared with year ended December 31, 2020

Research and development expense increased \$15.5 million, due primarily to increases of \$6.9 million in stock-based compensation expense primarily related to PSU grant timing, and to a lesser extent, an increased number of equity grants outstanding. Other major factors driving the increase included \$4.6 million in personnel expenses from higher headcount; \$2.9 million in product-development costs; and \$1.1 million in infrastructure costs from increased software costs.

Sales and Marketing

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Sales and marketing	\$ 37,894	\$ 34,287	\$ 28,663	\$ 3,607	\$ 5,624

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Sales and marketing expense comprises primarily personnel expenses (salaries, incentive sales compensation, or commission, benefits and other employee-related costs) and stock-based compensation expense for our sales and marketing personnel; travel, advertising and promotional expenses; and an allocated portion of infrastructure costs which include occupancy, depreciation and software costs.

Year ended December 31, 2022 compared with year ended December 31, 2021

Sales and marketing expense increased \$3.6 million, due primarily to increases of \$2.9 million in personnel expenses from higher headcount and the change in bonus payment structure from 100% PSUs to 50% cash and 50% PSUs, and \$554,000 in marketing and advertising expenses.

Year ended December 31, 2021 compared with year ended December 31, 2020

Sales and marketing expense increased \$5.6 million, due primarily to increases of \$3.5 million in stock-based compensation expense primarily related to PSU grant timing, and an increased number of equity grants outstanding. Other major factors driving the increase included \$2.2 million in personnel expenses from higher salaries and benefits, and commissions as a result of our increased revenue.

General and Administrative

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
General and administrative	\$ 45,465	\$ 36,137	\$ 34,958	\$ 9,328	\$ 1,179

General and administrative expense comprises primarily personnel expenses (salaries, benefits and other employee related costs) and stock-based compensation expense for our executive, finance, human resources and information technology personnel; legal, accounting and other professional service fees; travel and insurance expense; and an allocated portion of infrastructure costs which include occupancy, depreciation and software costs.

Year ended December 31, 2022 compared with year ended December 31, 2021

General and administrative expense increased \$9.3 million, due primarily to a \$4.4 million increase in non-settlement-related legal fees, \$2.3 million in personnel expenses from higher headcount and the change in bonus payment structure from 100% PSUs to 50% cash and 50% PSUs, and \$1.6 million in stock-based compensation expense related primarily to increased outstanding equity grants.

Year ended December 31, 2021 compared with year ended December 31, 2020

General and administrative expense increased \$1.2 million due primarily to increases of \$3.6 million in stock-based compensation expense primarily related to PSU grant timing, and an increased number of equity grants outstanding. Other major factors comprising the increase included \$3.1 million in professional services primarily related to non-settlement related legal fees offset by decreases of \$5.8 million in settlement and related costs incurred in 2020.

Restructuring costs

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Restructuring costs	\$ (102)	\$ 1,721	\$ —	\$ (1,823)	\$ 1,721

On February 2, 2021, we restructured our go-to-market organization to strategically align our global sales, product, partner development and marketing teams. We eliminated approximately seven full-time positions in our go-to-market organization, representing roughly 2% of our workforce. Restructuring charges were immaterial for the year ended December 31, 2022. We incurred restructuring charges of \$1.7 million for employee termination benefits as well as \$50,000 in other associated legal costs for the year ended December 31, 2021. We substantially completed our restructuring by June 30, 2021. For further information on this restructuring, please refer to Note 17 to our consolidated financial statements included elsewhere in this report.

Other Income, Net

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Other income, net	\$ 2,517	\$ 25	\$ 650	\$ 2,492	\$ (625)

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Other income, net comprises primarily interest income on our short-term investments.

Year ended December 31, 2022 compared with year ended December 31, 2021

Other income, net increased \$2.5 million, due primarily to higher interest rates on our short and long-term investments.

Year ended December 31, 2021 compared with year ended December 31, 2020

Other income, net decreased \$625,000, due primarily to lower interest rates on our short and long-term investments.

Induced Conversion Expense

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Induced conversion expense	\$ 2,232	\$ 11,333	\$ —	\$ (9,101)	\$ 11,333

In November 2021 and June 2022, we completed a privately negotiated repurchase of \$76.4 million and \$9.85 million principal amounts, respectively, of the 2019 Notes (“2019 Note Repurchase”). We accounted for the 2019 Notes Repurchase transactions as an induced conversion in accordance with Accounting Standards Codification 470-20, *Debt with Conversion and Other Options* (ASC 470-20). We recorded \$11.3 million and \$2.2 million in induced conversion expense in our Consolidated Statements of Operations for the years ended December 31, 2021 and December 31, 2022, respectively. The induced conversion expense represents the fair value of the consideration issued upon conversion in excess of the fair value of the securities issuable under the original terms of the 2019 Notes. For further information on the 2019 Notes, please refer to Note 7 to our consolidated financial statements included elsewhere in this report.

Interest Expense

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Interest expense	\$ 4,923	\$ 2,550	\$ 5,413	\$ 2,373	\$ (2,863)

Interest expense comprises primarily cash interest, amortization of debt issuance costs and debt discount.

In August 2020, the FASB issued guidance on debt with conversion and other options, or ASU 2020-06. On January 1, 2021, we adopted ASU 2020-06 using the modified retrospective transition method, accounting for the 2019 Notes on a whole-instrument basis. Our consolidated financial statements for the years ended December 31, 2021 and December 21, 2022 use the new standard and we no longer record amortization of debt discount. We have not adjusted the comparative prior reporting period.

Year ended December 31, 2022 compared with year ended December 31, 2021

Interest expense increased \$2.4 million, due primarily to us issuing the \$287.5 million aggregate principal amount of the 2021 Notes in November 2021, due May 15, 2027. For further information on the 2021 Notes, please refer to Note 7 to our consolidated financial statements included elsewhere in this report.

Year ended December 31, 2021 compared with year ended December 31, 2020

Interest expense decreased \$2.9 million, due primarily to the fact we no longer record amortization of debt discount as noted above, and to a lesser extent, the impact of our repurchase of \$76.4 million principal amount of the 2019 convertible senior notes in November 2021. For further information on the 2019 Notes, please refer to Note 7 to our consolidated financial statements included elsewhere in this report.

Income Tax Expense

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Income tax expense	\$ 184	\$ 153	\$ 89	\$ 31	\$ 64

We are subject to federal and state income taxes in the United States and foreign jurisdictions.

Year ended December 31, 2022 compared with year ended December 31, 2021

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Income tax expense remained comparable to the prior period.

Year ended December 31, 2021 compared with year ended December 31, 2020

Income tax expense remained comparable to the prior period.

Non-GAAP Financial Measures

Our key non-GAAP performance measures include adjusted EBITDA and non-GAAP net income (loss), as defined below. We use adjusted EBITDA and non-GAAP net income (loss) as key measures to understand and evaluate our core operating performance and trends, to prepare and approve our annual budget and to develop short- and long-term operating plans. We believe these measures provide useful information for period-to-period comparisons of our business to allow investors and others to understand and evaluate our operating results in the same manner as our management and board of directors. Our presentation of these non-GAAP financial measures is not meant to be considered in isolation or as a substitute for our financial results prepared in accordance with GAAP, and our non-GAAP measures may be different from similarly termed non-GAAP measures used by other companies.

Adjusted EBITDA

We define adjusted EBITDA as net income (loss) determined in accordance with GAAP, excluding, if applicable for the periods presented, the effects of stock-based compensation; depreciation; restructuring costs; settlement and related costs; induced conversion expense; other income, net; interest expense; loss on debt extinguishment; and income tax benefit (expense). We have excluded these costs and expenses because we do not believe they reflect our core operations and us excluding them enables more consistent evaluation of our operating performance. The following table presents a reconciliation of net loss to adjusted EBITDA:

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Net loss	\$ (24,301)	\$ (51,260)	\$ (51,923)	\$ 26,959	\$ 663
Adjustments:					
Other income, net	(2,517)	(25)	(650)	(2,492)	625
Interest expense	4,923	2,550	5,413	2,373	(2,863)
Income tax expense	184	153	89	31	64
Depreciation	6,044	4,602	4,504	1,442	98
Stock-based compensation	42,443	40,498	25,675	1,945	14,823
Restructuring costs	(102)	1,721	—	(1,823)	1,721
Settlement and related costs	—	(460)	5,359	460	(5,819)
Induced conversion expense	2,232	11,333	—	(9,101)	11,333
Adjusted EBITDA	\$ 28,906	\$ 9,112	\$ (11,533)	\$ 19,794	\$ 20,645

Non-GAAP Net Income (Loss)

We define non-GAAP net income (loss) as net income (loss), excluding, if applicable for the periods presented, the effects of stock-based compensation; depreciation; restructuring costs; settlement and related costs; induced conversion expense; amortization of debt discount related to the equity component of our convertible notes; and prepayment penalty on debt extinguishment.

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GAAP requires that certain convertible debt instruments that may be settled in cash on conversion be accounted for as separate liability and equity components in a manner that reflects our non-convertible debt borrowing rate. This accounting results in the debt component being treated as though it was issued at a discount, with the debt discount being amortized as additional non-cash interest expense over the debt instrument term using the effective interest method. As a result, we believe that excluding this non-cash interest expense attributable to the debt discount in calculating our non-GAAP net income (loss) is useful because this interest expense is not indicative of our ongoing operational performance. On January 1, 2021, we adopted ASU 2020-06 using the modified retrospective transition method, accounting for the 2019 Notes on a whole-instrument basis. Our consolidated financial statements for the year ended December 31, 2021 use the new standard and we no longer record amortization of debt discount.

The following table presents a reconciliation of net loss to non-GAAP net income (loss):

(in thousands)	Year Ended December 31,			2022 vs 2021	2021 vs 2020
	2022	2021	2020	Change	Change
Net loss	\$ (24,301)	\$ (51,260)	\$ (51,923)	\$ 26,959	\$ 663
Adjustments:					
Depreciation	6,044	4,602	4,504	1,442	98
Stock-based compensation	42,443	40,498	25,675	1,945	14,823
Restructuring costs	(102)	1,721	—	(1,823)	1,721
Amortization of debt discount	—	—	3,566	—	(3,566)
Settlement and related costs	—	(460)	5,359	460	(5,819)
Induced conversion expense	2,232	11,333	—	(9,101)	11,333
Non-GAAP net income	<u>\$ 26,316</u>	<u>\$ 6,434</u>	<u>\$ (12,819)</u>	<u>\$ 19,882</u>	<u>\$ 19,253</u>

Liquidity and Capital Resources

As of December 31, 2022, we had cash, cash equivalents and short-term investments of \$173.7 million, comprising cash deposits held at major financial institutions and short-term investments in a variety of securities, including U.S. government securities, treasury bills, corporate notes and bonds, commercial paper, asset-backed securities and money market funds. As of December 31, 2022, we had working capital of \$232.8 million.

Historically, we have funded our operations primarily through cash generated from operations and by issuing equity securities, convertible-debt offerings and/or borrowing under our prior senior credit facility. In 2022, our principal uses of cash were funding operations to capture our market opportunity and capital expenditures.

We believe, based on our current operating plan, that our existing cash, cash equivalents and short-term investments will be sufficient to meet our anticipated cash needs for at least the next 12 months. Over the longer term, we plan to continue investing to enhance and extend our platform. If our available funds are insufficient to fund our future activities or execute our strategy, then we may raise additional capital through equity, equity-linked or debt financing, to the extent such funding sources are available. Alternatively, we may need to reduce expenses to manage liquidity; however, any such reductions could adversely impact our business and competitive position.

Sources of Funds

From time to time, we may explore additional financing sources and ways to reduce our cost of capital, including equity, equity-linked and debt financing. In addition, in connection with any future acquisitions, we may pursue additional financing which may be debt, equity or equity-linked financing or a combination thereof. We can provide no assurance that any additional financing will be available to us on acceptable terms.

2019 Notes

In December 2019, we issued the 2019 Notes in an aggregate principal amount of \$86.3 million. The 2019 Notes were a senior unsecured obligation, bearing interest at a fixed rate of 2.00% per year, payable semi-annually in arrears on June 15 and December 15 of each year, beginning on June 15, 2020. The 2019 Notes were convertible into cash, shares of our common stock or a combination thereof, at our election, and matured on December 15, 2026, unless earlier repurchased, redeemed or converted in accordance with the indenture terms.

The net proceeds from the 2019 Notes were approximately \$83.5 million after fees and expenses. We used some of the net proceeds to pay the cost of the capped-call transactions and repay our senior credit facility, and the rest for general corporate purposes.

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In November 2021, we completed a privately negotiated repurchase of \$76.4 million principal amount of the 2019 Notes, accounting for the transaction as an induced conversion in accordance with Accounting Standards Codification 470-20, *Debt with Conversion and Other Options* (ASC 470-20). We paid approximately \$183.6 million in cash and accrued and unpaid interest thereon in connection with the induced conversion.

In June 2022, we repurchased the remaining \$9.85 million principal amount of the 2019 Notes accounting for the transaction as an induced conversion in accordance with ASC 470-20. We paid approximately \$17.6 million in cash and accrued and unpaid interest thereon in connection with the induced conversion.

For further information on the terms of this debt, please refer to Note 7 to our consolidated financial statements included elsewhere in this report.

2021 Notes

In November 2021, we issued the 2021 Notes in an aggregate principal amount of \$287.5 million. The 2021 Notes are our senior unsecured obligation, bearing interest at a fixed rate of 1.125% per year, payable semi-annually in arrears on May 15 and November 15 of each year, beginning on May 15, 2022. The 2021 Notes are convertible into cash, shares of our common stock or a combination thereof, at our election, and will mature on May 15, 2027 unless earlier repurchased, redeemed or converted in accordance with the indenture terms.

The net proceeds from the 2021 Notes were approximately \$278.4 million after initial debt issuance costs, fees and expenses. We used approximately \$183.6 million of the net proceeds to repurchase approximately \$76.4 million aggregate principal amount of the 2019 Notes through individual privately negotiated transactions concurrent with the 2021 Notes offering. We used \$17.6 million to repurchase the remaining \$9.85 million aggregate principal of the 2019 Notes through individual privately negotiated transactions in June 2022. Please refer to the section “*Repurchase of the Convertible Senior Notes – 2019*” as described in Note 7 to our consolidated financial statements included elsewhere in this report. We will use the rest of the net proceeds for general corporate purposes.

For further information on the terms of this debt, please refer to Note 7 to our consolidated financial statements included elsewhere in this report.

Historical Cash Flow Trends

The following table shows a summary of our cash flows for the periods indicated:

(in thousands)	Year Ended December 31,		
	2022	2021	2020
Net cash provided by (used in) operating activities	\$ 641	\$ 6,465	\$ (16,877)
Net cash used in investing activities	(102,799)	(18,642)	(36,287)
Net cash provided by (used in) financing activities	(2,148)	112,444	9,902

Operating Cash Flows

For the year ended December 31, 2022, we generated \$641,000 of net cash from operating activities. These net cash proceeds were due primarily to \$27.8 million of net loss adjusted for non-cash items, partially offset by \$27.2 million of working capital usage due primarily to higher inventory and accounts receivable offset by higher accounts payable.

For the year ended December 31, 2021, we generated \$6.5 million of net cash from operating activities. The net cash proceeds were driven primarily by \$6.2 million of net loss adjusted for non-cash items and \$288,000 of working capital contribution.

For the year ended December 31, 2020, we used \$16.9 million of net cash from operating activities. The net cash usage was driven primarily by \$17.8 million of net loss adjusted for non-cash items, partially offset by \$963,000 of working capital contribution.

Investing Cash Flows

For the year ended December 31, 2022, we used \$102.8 million of net cash from investing activities. This net cash usage was due primarily to investments and equipment purchases of \$205.8 million and \$12.1 million, respectively, partially offset by investment maturities of \$114.8 million.

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For the year ended December 31, 2021, we used \$18.6 million of net cash from investing activities. The net cash usage was driven primarily by investments and equipment purchases of \$84.4 million and \$16.2 million, respectively, partially offset by investment maturities of \$82 million.

For the year ended December 31, 2020, we used \$36.3 million of net cash from investing activities. The net cash usage was driven primarily by investments and equipment purchases of \$82.7 million and \$3.1 million, respectively, partially offset by investment maturities of \$49.5 million.

Financing Cash Flows

For the year ended December 31, 2022, we used \$2.2 million of net cash from financing activities. This net cash usage was due primarily to \$17.6 million to repurchase the remaining \$9.85 million aggregate principal amount of the 2019 Notes described in the section “*Repurchase of the Convertible Senior Notes – 2019*” as described in Note 7 to our consolidated financial statements included elsewhere in this report. Other major factors included \$15.4 million from stock options exercises and our employee stock-purchase plan, or ESPP.

For the year ended December 31, 2021, we generated \$112.4 million of net cash from financing activities. The net cash proceeds were driven primarily by \$278.4 million net proceeds from issuing the 2021 Notes. This amount was offset by \$183.6 million for the cash repurchase of approximately \$76.4 million aggregate principal amount of the 2019 Notes through individual privately negotiated transactions concurrent with the offering of the 2021 Notes described in the section “*Repurchase of the Convertible Senior Notes – 2019*” as described in Note 7 to our consolidated financial statements included elsewhere in this report. Other major factors included \$17.6 million from exercised stock options and our employee stock purchase plan.

For the year ended December 31, 2020, we generated \$9.9 million of net cash from financing activities. The net cash proceeds were driven primarily by \$10.2 million from exercised stock options and our employee stock purchase plan.

Contractual Obligations

The following table reflects a summary of our contractual obligations as of December 31, 2022:

	Payments Due By Period				
	Total	Less Than 1 Year	1-3 Years	3-5 Years	More Than 5 Years
(in thousands)					
Convertible senior notes ⁽¹⁾	\$ 302,055	\$ 3,234	\$ 6,469	\$ 292,352	\$ —
Operating lease obligations					
Operating lease obligations	17,664	4,059	7,772	4,642	1,191
Sublease income	(123)	(123)	—	—	—
Net operating lease commitments	17,541	3,936	7,772	4,642	1,191
Purchase commitments ⁽²⁾	98,182	98,182	—	—	—
Total	\$ 417,778	\$ 105,352	\$ 14,241	\$ 296,994	\$ 1,191

⁽¹⁾ The 2021 Notes include \$14.6 million in interest payments.

⁽²⁾ Purchase commitments comprise primarily noncancelable commitments to purchase \$87.9 million of inventory as of December 31, 2022 and noncancelable software license agreements with vendors and equipment purchases.

Off-Balance-Sheet Arrangements

Since inception, we have not had any relationships with unconsolidated entities, such as entities often referred to as structured finance or special-purpose entities, or financial partnerships that would have been established for the purpose of facilitating off-balance-sheet arrangements or for another contractually narrow or limited purpose.

Critical Accounting Policies and Significant Estimates

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements which we have prepared in accordance with GAAP. Our preparation of these consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of assets and liabilities and related disclosure of contingent assets and liabilities, revenue and expenses at the date of the consolidated financial statements. Generally, we base our estimates on historical experience and on various other assumptions, in accordance with GAAP, that we believe to be reasonable under the circumstances. Our actual results may differ from these estimates under other assumptions or conditions.

Critical accounting policies and estimates are those we consider the most important to the portrayal of our financial condition and results of operations because they require our most difficult, subjective or complex judgments, often as a result of the need to make estimates about the effect of matters that are inherently uncertain. Our critical accounting policies and estimates include those related to:

- revenue recognition;
- inventory;
- income taxes; and
- stock-based compensation.

Revenue Recognition

We generate revenue primarily from sales of hardware products. We also generate revenue from software, extended warranties, enhanced maintenance, support services and NRE development services, none of which are material.

We recognize revenue when we transfer control of the promised goods or services to our customers, which for hardware sales is generally at the time of product shipment as determined by agreed-upon shipping terms. We measure revenue based on the amount of consideration we expect to be entitled-to in exchange for those goods or services. We expect the period between when we transfer control of promised goods or services and when we receive payment to be one year or less, and that expectation is consistent with our historical experience. As such, we do not adjust our revenue for the effects of a significant financing component. We recognize any variable consideration, which comprises primarily sales incentives, as revenue reduction at the time of revenue recognition. We estimate sales incentives based on our historical experience and current expectations at the time of revenue recognition and update them at the end of each reporting period as additional information becomes available.

Our reader and gateway products are highly dependent on embedded software and cannot function without this embedded software. We account for the hardware and embedded software as a single performance obligation and recognize revenue when control is transferred.

Our customer contracts with multiple performance obligations generally include a combination of hardware products, standalone software, extended warranty, enhanced maintenance and support services. For these contracts, we account for individual performance obligations separately if they are distinct. We allocate the transaction price to the separate performance obligations on a relative standalone selling-price basis. In instances where the standalone selling price is not directly observable, such as when we do not sell the product or service separately, we determine the standalone selling price using one, or a combination of, the adjusted market assessment or expected cost-plus margin. We defer amounts allocated to extended warranty and enhanced maintenance sold with our reader and gateway products and recognize them on a straight-line basis over the term of the arrangement, which is typically from one to three years. We defer amounts allocated to support services sold with our reader and gateway products and recognize them when we transfer control of the promised services to our customers.

For NRE development agreements that involve significant production, modification or customization of our products, we generally recognize revenue over the performance period using the cost-input method because it best depicts the transfer of services to the customer. We receive payments under these agreements based on a billing schedule. Contract assets relate to our conditional right to consideration for our completed performance under these agreements. We record accounts receivable when the right to consideration becomes unconditional. For the periods presented in this report, our contract assets, deferred revenue and the value of unsatisfied performance obligations for NRE development agreements are not material.

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If a customer pays consideration before we transfer a good or service under the contract, then we classify those amounts as contract liabilities, or deferred revenue. We recognize contract liabilities as revenue when we transfer control of the promised goods or services to our customers.

Payment terms typically range from 30 to 120 days. We present revenue net of sales tax in our consolidated statements of operations. We include shipping charges billed to customers in revenue and the related shipping costs in cost of revenue.

Practical Expedients and Exemptions: We expense sales commissions when incurred because we expect the amortization period to be one year or less. We record these costs within sales and marketing expenses. We do not disclose the value of unsatisfied performance obligations for (1) contracts with an original expected length of one year or less and (2) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

Inventory

We state inventories at the lower of cost or estimated net realizable value using the average costing method, which approximates a first-in, first-out method. Inventories comprise raw materials, work-in-process and finished goods. We continuously assess the value of our inventory and write down its value for estimated excess and obsolete inventory. This evaluation includes an analysis of inventory on hand, current and forecasted demand, product development plans, and market conditions. If future demand or market conditions are less favorable than our projections, or our product development plans change from current expectations, then a write-down of excess or obsolete inventory may be required and would be reflected in cost of goods sold in the period the updated information is known.

Income Taxes

We use the asset and liability approach for accounting, which requires recognizing deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement and tax bases. We measure deferred tax assets and liabilities using enacted tax rates expected to be in effect when the assets and liabilities are recovered or settled. We recognize the effects of a change in tax rates on deferred tax assets and liabilities in the year that of the enactment date. We determine deferred tax assets, including historical net operating losses and deferred tax liabilities, based on temporary differences between the book and tax bases of the assets and liabilities. We believe that it is currently more likely than not that our deferred tax assets will not be realized and, as such, we have recorded a full valuation allowance for these assets. We evaluate the likelihood of our ability to realize deferred tax assets in future periods on a quarterly basis, and if evidence indicates we will be able to realize some or all of our deferred tax assets then we will revise our valuation allowance accordingly.

We use a two-step approach for evaluating uncertain tax positions. First, we evaluate recognition, which requires us to determine if the weight of available evidence indicates that a tax position is more likely than not to be sustained upon audit, including resolution of related appeals or litigation processes. If we consider a tax position more likely than not to be unsustainable, then no benefits of the position are recognized. Second, we measure the uncertain tax position based on the largest amount of benefit which is more likely than not to be realized on effective settlement. This process involves estimating our actual current tax exposure, including assessing the risks associated with tax audits, together with assessing temporary differences resulting from the different treatment of items for tax and financial reporting purposes. If actual results differ from our estimates, then our net operating loss and credit carryforwards could be materially impacted.

Us realizing the benefits of the NOLs and credit carryforwards depends on sufficient taxable income in future years. We have established a valuation allowance against the carrying value of our deferred tax assets, as it is currently more likely than not we will be unable to realize these deferred tax assets. In addition, using NOLs and credits to offset future income subject to taxes may be subject to substantial annual limitations due to the “change in ownership” provisions of the Code and similar state provisions. Events that cause limitations in the amount of NOLs that we may use in any one year include, but are not limited to, a cumulative ownership change of more than 50%, as defined by Code Sections 382 and 383, over a three-year period. Using our NOLs and tax credit carryforwards could be significantly reduced if a cumulative ownership change of more than 50% has occurred in our past or occurs in our future.

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We do not anticipate that the amount of our existing unrecognized tax benefits will significantly increase or decrease within the next 12 months. Due to the presence of NOLs in most jurisdictions, our tax years remain open for examination by taxing authorities back to 2000.

Stock-Based Compensation

We have various equity award plans (“Plans”) for granting share-based awards to employees, consultants and non-employee directors of the Company. The Plans provide for granting several available forms of stock compensation such as stock option awards, restricted stock units, or RSUs, RSUs with performance conditions, or PSUs, and RSUs with market and service conditions, or MSUs.

We measure stock-based compensation costs for all share-based awards at fair value on the measurement date, which is typically the grant date. We determine the fair value of stock options using the Black-Scholes option-pricing model, which considers, among other things, estimates and assumptions on the expected life of the options, stock price volatility and market value of the Company’s common stock. We determine the fair value of RSUs and PSUs based on the closing price of our common stock at grant date. Additionally, for awards with a market condition, we use a Monte Carlo simulation model to estimate grant date fair value, which takes into consideration the range of possible stock price of total stockholder return outcomes.

Recent Accounting Pronouncements

For information on recent accounting pronouncements, please refer to Note 2 in our consolidated financial statements included elsewhere in this report.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risks in the ordinary course of our business. Some of these risks are related to fluctuations in interest rates.

Interest Rate Risk

Under our current investment policy, we invest our excess cash in money market funds, U.S. government securities, corporate bonds and notes and commercial paper. Our current investment policy seeks first to preserve principal, second to provide liquidity for our operating and capital needs and third to maximize yield without putting our principal at risk. We do not enter into investments for trading or speculative purposes.

We had cash, cash equivalents and short-term investments of \$173.7 million and \$193.3 million as of December 31, 2022 and 2021, respectively. Our investments are exposed to market risk due to fluctuations in prevailing interest rates, which may reduce the yield on our investments or their fair value. Because most of our investment portfolio is short-term in nature, we do not believe an immediate 10% increase in interest rates would have a material effect on the fair market value of our portfolio, and therefore we do not expect our results of operations or cash flows to be materially affected by a sudden change in market interest rates.

Our convertible notes have fixed interest rates, thus a hypothetical 100 basis point increase in interest rates would not impact interest expense.

Inflation Risk

We do not believe that inflation has had a material effect on our business, financial condition or results of operations. To date, we have been able to substantially offset higher product costs by increasing our product selling prices. If our product costs became subject to significant future inflationary pressures, then we may not be able to fully offset these higher costs through price increases. Our inability or failure to do so could adversely affect our business, financial condition and results of operations.

Foreign Currency Exchange Risk

Our foreign subsidiaries are considered extensions of the U.S. Company. The functional currency of our foreign subsidiaries is the U.S. dollar. Accordingly, gains and losses from remeasuring transactions denominated in currencies other than U.S. dollars are included in other income, net on the consolidated statements of operations.

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For any of the periods presented, we did not have material impact from exposure to foreign currency fluctuation. As we grow operations, our exposure to foreign currency risk will likely become more significant.

Item 8. Financial Statements and Supplementary Data

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
Impinj, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Impinj, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity and cash flows for each of the three years in the period ended December 31, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 13, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the 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 financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the 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 account or disclosures to which it relates.

Inventory valuation

Description of the Matter

The Company's inventory totaled \$46.4 million as of December 31, 2022. As explained in Note 2 to the financial statements, the Company determines the appropriate value of all inventory in each reporting period. Obsolete inventory or inventory in excess of management's estimated usage requirement is written down to its estimated net realizable value if those amounts are determined to be less than cost.

Auditing management's estimates for excess and obsolete inventory involved subjective auditor judgment because the estimates rely on a number of factors that are affected by market and economic conditions outside the Company's control, including management's assumptions about the product supply, demand, and life cycle.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design, and tested the operating effectiveness of internal controls over the Company's excess and obsolete inventory reserve process. This included management's determination of the assumptions and data underlying the excess and obsolete inventory valuation.

To test the Company's estimates for excess and obsolete inventory, we performed audit procedures that included, among others, testing the accuracy and completeness of the underlying data used in the estimation calculations and evaluating significant assumptions (e.g., forecasted customer demand, technological and/or market obsolescence, and possible alternative uses). We compared the significant assumptions used by management to current industry and economic trends. We assessed whether there were any potential sources of contrary information, including historical forecast accuracy or history of significant revisions to previously recorded inventory valuation adjustments. We also performed sensitivity analyses over the significant assumptions to evaluate the changes in the excess and obsolete inventory estimates that would result from changes in the underlying assumptions.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2020.

Seattle, Washington

February 13, 2023

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Impinj, Inc.
Consolidated Balance Sheets
(in thousands, except par value)

	<u>December 31, 2022</u>	<u>December 31, 2021</u>
Assets:		
Current assets:		
Cash and cash equivalents	\$ 19,597	\$ 123,903
Short-term investments	154,148	69,443
Accounts receivable, net of allowances of \$755 and \$1,132 at December 31, 2022 and 2021, respectively	49,996	35,449
Inventory	46,397	21,958
Prepaid expenses and other current assets	5,032	5,049
Total current assets	275,170	255,802
Long-term investments	19,200	14,225
Property and equipment, net	39,027	27,500
Operating lease right-of-use assets	10,490	11,667
Other non-current assets	1,969	2,462
Goodwill	3,881	3,881
Total assets	<u>\$ 349,737</u>	<u>\$ 315,537</u>
Liabilities and stockholders' equity (deficit):		
Current liabilities:		
Accounts payable	\$ 25,024	\$ 11,732
Accrued compensation and employee related benefits	9,048	6,365
Accrued and other current liabilities	2,925	3,072
Current portion of operating lease liabilities	3,122	4,143
Current portion of long-term debt	—	9,633
Current portion of deferred revenue	2,250	558
Total current liabilities	42,369	35,503
Long-term debt, net of current portion	280,244	278,661
Operating lease liabilities, net of current portion	11,066	11,934
Other long-term liabilities	118	279
Deferred revenue, net of current portion	349	236
Total liabilities	<u>334,146</u>	<u>326,613</u>
Commitments and contingencies (Note 11)		
Stockholders' equity (deficit):		
Preferred stock, \$0.001 par value — 5,000 shares authorized, no shares issued and outstanding at December 31, 2022 and 2021	—	—
Common stock, \$0.001 par value — 495,000 shares authorized, 26,098 and 24,737 shares issued and outstanding at December 31, 2022 and 2021, respectively	26	25
Additional paid-in capital	403,599	351,422
Accumulated other comprehensive loss	(1,249)	(39)
Accumulated deficit	(386,785)	(362,484)
Total stockholders' equity (deficit)	15,591	(11,076)
Total liabilities and stockholders' equity (deficit)	<u>\$ 349,737</u>	<u>\$ 315,537</u>

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

Impinj, Inc.
Consolidated Statements of Operations
(in thousands, except per share data)

	Year Ended December 31,		
	2022	2021	2020
Revenue	\$ 257,800	\$ 190,283	\$ 138,923
Cost of revenue	119,916	91,329	73,783
Gross profit	137,884	98,954	65,140
Operating expenses:			
Research and development	74,106	64,058	48,590
Sales and marketing	37,894	34,287	28,663
General and administrative	45,465	36,137	34,958
Restructuring costs	(102)	1,721	—
Total operating expenses	157,363	136,203	112,211
Loss from operations	(19,479)	(37,249)	(47,071)
Other income, net	2,517	25	650
Induced conversion expense	(2,232)	(11,333)	—
Interest expense	(4,923)	(2,550)	(5,413)
Loss before income taxes	(24,117)	(51,107)	(51,834)
Income tax expense	(184)	(153)	(89)
Net loss	<u>\$ (24,301)</u>	<u>\$ (51,260)</u>	<u>\$ (51,923)</u>
Net loss per share — basic and diluted	<u>\$ (0.95)</u>	<u>\$ (2.12)</u>	<u>\$ (2.28)</u>
Weighted-average shares outstanding — basic and diluted	<u>25,539</u>	<u>24,176</u>	<u>22,819</u>

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

Impinj, Inc.
Consolidated Statements of Comprehensive Loss
(in thousands)

	Year Ended December 31,		
	2022	2021	2020
Net loss	\$ (24,301)	\$ (51,260)	\$ (51,923)
Other comprehensive loss, net of tax:			
Unrealized loss on investments	(1,210)	(42)	(31)
Total other comprehensive loss	(1,210)	(42)	(31)
Comprehensive loss	<u>\$ (25,511)</u>	<u>\$ (51,302)</u>	<u>\$ (51,954)</u>

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

Impinj, Inc.
Consolidated Statements of Changes in Stockholders' Equity (Deficit)
(in thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (loss)	Total Stockholders' Equity (Deficit)
	Shares	Amount				
Balance at December 31, 2019	22,217	\$ 22	\$ 387,926	\$ (262,743)	\$ 34	\$ 125,239
Issuance of common stock	1,133	1	10,158	—	—	10,159
Stock-based compensation	—	—	25,675	—	—	25,675
Net loss	—	—	—	(51,923)	—	(51,923)
Other comprehensive loss	—	—	—	—	(31)	(31)
Balance at December 31, 2020	23,350	\$ 23	\$ 423,759	\$ (314,666)	\$ 3	\$ 109,119
Cumulative-effect adjustment from adoption of ASU 2020-06	—	—	(32,743)	3,442	—	(29,301)
Issuance of common stock	1,387	2	17,646	—	—	17,648
Stock-based compensation	—	—	40,498	—	—	40,498
Induced conversion on 2019 Notes (Note 7)	—	—	(97,738)	—	—	(97,738)
Net loss	—	—	—	(51,260)	—	(51,260)
Other comprehensive loss	—	—	—	—	(42)	(42)
Balance at December 31, 2021	24,737	\$ 25	\$ 351,422	\$ (362,484)	\$ (39)	\$ (11,076)
Issuance of common stock	1,361	1	15,415	—	—	15,416
Stock-based compensation	—	—	42,443	—	—	42,443
Induced conversion on 2019 Notes (Note 7)	—	—	(5,681)	—	—	(5,681)
Net loss	—	—	—	(24,301)	—	(24,301)
Other comprehensive loss	—	—	—	—	(1,210)	(1,210)
Balance at December 31, 2022	26,098	\$ 26	\$ 403,599	\$ (386,785)	\$ (1,249)	\$ 15,591

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

Impinj, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2022	2021	2020
Operating activities:			
Net loss	\$ (24,301)	\$ (51,260)	\$ (51,923)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Depreciation	6,044	4,602	4,504
Stock-based compensation	42,443	40,498	25,675
Accretion of discount or amortization of premium on investments	(233)	896	224
Amortization of debt issuance costs	1,601	568	3,680
Loss on fixed asset disposal	57	—	—
Induced conversion expense related to convertible notes	2,232	11,333	—
Settlement and related costs	—	(460)	—
Changes in operating assets and liabilities:			
Accounts receivable	(14,547)	(10,446)	(1,268)
Inventory	(24,439)	14,371	(2,176)
Prepaid expenses and other assets	852	(770)	(3,081)
Accounts payable	7,371	2,340	3,491
Accrued compensation and employee related benefits	2,683	836	(330)
Accrued and other liabilities	(215)	987	(1,357)
Operating lease right-of-use assets	3,414	2,792	2,740
Operating lease liabilities	(4,126)	(3,528)	(3,380)
Deferred revenue	1,805	(6,294)	6,324
Net cash provided by (used in) operating activities	641	6,465	(16,877)
Investing activities:			
Purchases of investments	(205,749)	(84,412)	(82,735)
Proceeds from maturities of investments	114,750	82,000	49,522
Proceeds from sale of property and equipment	279	—	—
Purchases of property and equipment	(12,079)	(16,230)	(3,074)
Net cash used in investing activities	(102,799)	(18,642)	(36,287)
Financing activities:			
Principal payments on finance lease obligations	—	(2)	(257)
Proceeds from exercise of stock options and employee stock purchase plan	15,416	17,648	10,159
Proceeds from issuance of 2021 Notes, net of issuance costs	—	278,422	—
Payment of 2019 Notes	(17,564)	(183,624)	—
Net cash provided by (used in) financing activities	(2,148)	112,444	9,902
Net increase (decrease) in cash and cash equivalents	(104,306)	100,267	(43,262)
Cash and cash equivalents			
Beginning of period	123,903	23,636	66,898
End of period	<u>\$ 19,597</u>	<u>\$ 123,903</u>	<u>\$ 23,636</u>
Supplemental disclosure of cashflow information:			
Cash paid for interest	3,420	1,559	1,720
Purchases of property and equipment not yet paid	6,245	417	1,076
Disposal of fully depreciated property and equipment	199	4,467	308

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

IMPINJ, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Description of Business

Impinj, Inc., a Delaware corporation, is headquartered in Seattle, Washington. The Impinj platform wirelessly connects items and delivers data about the connected items to business and consumer applications enabled by our partner network. Impinj's revenue derives from selling our platform's constituent elements — endpoint ICs, reader ICs, readers, gateways and software — as well as from development, service and license agreements.

Note 2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements include Impinj, Inc. and its wholly owned subsidiaries. We have eliminated intercompany balances and transactions in consolidation. We have reclassified certain amounts on our consolidated balance sheets in prior period to conform to current period presentation. We have prepared these consolidated financial statements in conformity with U.S. generally accepted accounting principles, or GAAP.

Use of Estimates

Preparing financial statements in conformity with GAAP requires management to make certain estimates, judgments and assumptions that affect the reported amounts of assets and liabilities and related disclosures as of the date of the financial statements, as well as the reported revenue and expenses during the periods presented. On an ongoing basis, we evaluate our estimates, including those related to revenue recognition, sales incentives, percentage completion of development contracts, inventory excess and obsolescence, income taxes and fair value of stock awards. To the extent there are material differences between our estimates, judgments, or assumptions and actual results, our financial statements will be affected.

Concentrations of Credit Risk

Financial instruments, which potentially subject us to credit-risk concentration, comprise primarily cash equivalents, investments and accounts receivable. We place our cash and cash equivalents and investments with major financial institutions, which management assesses to be of high credit quality, to limit our investment exposure. We extend credit to customers based on our evaluation of the customer's financial condition and

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generally do not require collateral. The following tables present total revenue and accounts receivable concentration for the indicated periods as of the dates presented:

	Year Ended December 31,		
	2022	2021	2020
Revenue:			
Avery Dennison ⁽¹⁾	28%	32%	32%
Arizon	10	11	10
	38%	43%	42%

(1) Includes revenue concentration related to Smartrac. Avery Dennison acquired Smartrac in March 2020.

	As of December 31,	
	2022	2021
Accounts Receivable:		
Avery Dennison ⁽¹⁾	24%	21%
Arizon	13	13
Intel	*	13
Blue Star	*	13
	37%	60%

* Less than 10%

(1) Includes accounts receivable concentration related to Smartrac.

Concentration of Supplier Risk

We outsource the manufacturing and production of our hardware products to a small number of suppliers. We believe other suppliers could provide similar products on comparable terms if needed. However, a supplier change would delay manufacturing and could cause a sales loss, which would adversely affect our operating results.

Cash and Cash Equivalents

Cash includes demand deposits with banks or financial institutions. Cash equivalents include short-term, highly liquid investments that are both readily convertible to known amounts of cash and so near their maturity that they present minimal risk of changes in value because of changes in interest rates. Our cash equivalents are solely investments with an original or remaining maturity of three months or less at the date of purchase. We regularly maintain cash amounts exceeding federally insured limits at financial institutions.

Investments

Our investments comprise fixed income securities, including U.S. government securities, corporate notes and bonds, commercial paper and asset-backed securities. The contractual maturities of some of our available-for-sale, or AFS, debt securities exceed a year and are classified as long-term investments on our balance sheet. We carry AFS debt securities at fair value with unrealized gains and losses reported as a component of other comprehensive income (loss). Our investments are subject to a periodic impairment review. We recognize an impairment charge when a decline in fair value of its investments below the cost basis is determined to be other-than-temporary. Factors we consider in determining whether a loss is temporary include the extent and length of time the investment's fair value has been lower than its cost basis, the financial condition and near-term prospects of the investee, our intent to sell the security and whether or not we will be required to sell the security prior to the expected recovery of the investment's amortized cost basis. No such impairment changes were recorded during the years ended December 31, 2022, 2021 and 2020. See Note 3 tables for the cost or amortized cost, gross unrealized gains, gross unrealized losses and total estimated fair value of our financial assets as of December 31, 2022 and 2021.

Fair Value Measurement

Accounting standards define fair value as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market in an orderly transaction between market participants on the measurement date. The standards also establish a fair value hierarchy, which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. There are three levels of inputs that may be used to measure fair value:

- Level 1 — Quoted prices in active markets for identical assets or liabilities.
- Level 2 — Assets and liabilities valued based on observable market data for similar instruments, such as quoted prices for similar assets or liabilities.
- Level 3 — Unobservable inputs that are supported by little or no market activity; instruments valued on the best available data, some of which are internally developed; and considered risk premiums that a market participant would require.

We applied the following methods and assumptions in estimating our fair value measurements:

Cash Equivalents — Cash equivalents comprise highly liquid investments, including money market funds with original or remaining maturities of less than three months at the acquisition date. We record the fair value measurement of these assets based on quoted market prices in active markets.

Investments — Our investments comprise fixed income securities, which include U.S. government securities, corporate notes and bonds, commercial paper, treasury bills and asset-backed securities. We base the fair value measurement of these assets on observable market-based inputs or inputs that are derived principally from, or corroborated by, observable market data by correlation or other means.

Debt — See Note 7 for the carrying amount and estimated fair value of our convertible senior notes due 2027.

Accounts Receivable and Allowances

Accounts receivable comprises amounts billed and currently due from customers, net of allowances for doubtful accounts, sales returns and price exceptions.

The allowance for doubtful accounts is our best estimate of the amount of probable lifetime-expected credit losses in existing accounts receivable and is determined based on our historical collections experience, age of the receivable, knowledge of the customer and the condition of the general economy and industry as a whole. We record changes in our estimate of the allowance for doubtful accounts through bad debt expense and write off the receivable and corresponding allowance when accounts are ultimately determined to be uncollectible. We include bad debt expense in general and administrative expenses. For the periods presented in this report, bad debt expense and the allowance for doubtful account were not material.

We derive most of our accounts receivable from sales to original equipment manufacturers, or OEMs, original design manufacturers, or ODMs, solution providers, and distributors who are large, well-established companies. We do not have customers that represent a significant credit risk based on current economic conditions and past collection experience. Also, we have not had material past-due balances on our accounts receivable as of December 31, 2022 or 2021.

The allowance for sales returns and price exceptions is our best estimate based on our historical experience and currently available evidence. We record changes in our estimate of the allowance for sales returns and price exceptions through revenue, and relieve the allowance when we receive product returns or process claims for price exceptions. The following table summarizes our allowance for sales returns (in thousands):

	Balance at Beginning of Year	Additional Reserve	Applied Sales Return	Balance at End of Year
Allowance for sales returns and price exceptions:				
During year ended December 31, 2022	\$ 947	\$ 1,899	\$ (2,241)	\$ 605
During year ended December 31, 2021	406	2,780	(2,239)	947
During year ended December 31, 2020	1,072	1,109	(1,775)	406

Inventory

We state inventories at the lower of cost or estimated net realizable value using the average costing method, which approximates a first-in, first-out method. Inventories comprise raw materials, work-in-process and finished goods. We continuously assess the value of our inventory and write down its value for estimated excess and obsolete inventory. This evaluation includes an analysis of inventory on hand, current and forecasted demand, product development plans and market conditions. If future demand or market conditions are less favorable than our projections, or our product development plans change from current expectations, then a write-down of excess or obsolete inventory may be required and would be reflected in cost of goods sold in the period the updated information is known.

Sales of fully reserved inventory had an immaterial impact on our 2022 gross margin and a favorable net impact of 1.5% on our 2021 gross margin. We recorded inventory excess and obsolescence charges which had an unfavorable net impact of 2.2% on our 2020 gross margin. The 2021 favorable net impact was primarily from sales of fully reserved inventory, primarily endpoint ICs and readers included in the excess and obsolescence charge recorded below. During 2020, we recorded excess and obsolescence charges due primarily to reduced demand for older-generation endpoint ICs and EU gateways, which reduced the inventory value of the impacted products to zero. At the time, we expected future demand to be met by our newer generation endpoint ICs and EU gateways. Instead, because of industry-wide wafer shortages and reader supply constraints in 2022 and 2021, we sold a significant portion of the reserved endpoint ICs and gateways in the years ended December 31, 2022 and 2021.

Property and Equipment

We record property and equipment at cost and depreciate it using the straight-line method over the estimated useful lives of the related assets. The useful lives are as follows:

Category	Useful Life
Machinery and equipment	2 to 10 years
Computer equipment and software	3 to 5 years
Furniture and fixtures	3 to 7 years
Equipment acquired under finance leases	3 to 7 years
Leasehold improvements	Shorter of remaining lease term or expected useful life

We charge maintenance and repair costs to expense when incurred. We capitalize major improvements, which extend the useful life of the related asset. Upon disposal of a fixed asset, we record a gain or loss based on the differences between the proceeds received and the net book value of the disposed asset.

Other Assets

Other assets primarily comprise capitalized implementation costs from cloud computing arrangements and security deposits. We capitalize eligible costs associated with cloud computing arrangements over the term of the arrangement, plus reasonably certain renewals, and recognize those costs on a straight-line basis in the same line item in the consolidated statement of operations as the expense for fees associated with the cloud computing arrangement. Cloud computing arrangement costs, included in prepaid expenses and other current assets, were \$413,000 and \$413,000, and other non-current assets were \$1.8 million and \$2.3 million, as of December 31, 2022 and 2021, respectively. Amortization expense associated with the cloud computing arrangements was \$413,000 for 2022, \$215,000 for 2021 and not material for 2020. We present cash flows related to capitalized implementation costs in cash flows used in operating activities.

Goodwill

Goodwill is measured as the excess of the cost of acquisition over the sum of the amounts assigned to identifiable tangible and intangible assets acquired less liabilities assumed. We perform an annual impairment assessment of goodwill at the reporting unit level as of September 30, or more frequently if indicators of potential impairment exist. Our annual impairment assessment requires a comparison of the fair value of our reporting unit to the carrying value. If the fair value of a reporting unit exceeds its carrying amount, goodwill of the reporting unit is considered not impaired. If the carrying value of a reporting unit is greater than its fair value, we will recognize an impairment loss in an amount equal to that excess, limited to the total amount of goodwill allocated to that reporting unit. Additionally, we will consider the income tax effect from any tax deductible goodwill on the carrying amount of the reporting unit when measuring the goodwill impairment loss.

Revenue Recognition

We generate revenue primarily from sales of hardware products. We also generate revenue from software, extended warranties, enhanced maintenance, support services, and nonrecurring engineering, or NRE, development services, none of which are material.

We recognize revenue when we transfer control of the promised goods or services to our customers, which for hardware sales is generally at the time of product shipment as determined by agreed-upon shipping terms. We measure revenue based on the amount of consideration we expect to be entitled-to in exchange for those goods or services. We expect the period between when we transfer control of promised goods or services and when we receive payment to be one year or less, and that expectation is consistent with our historical experience. As such, we do not adjust our revenue for the effects of a significant financing component. We recognize any variable consideration, which comprises primarily sales incentives, as revenue reduction at the time of revenue recognition. We estimate sales incentives based on our historical experience and current expectations at the time of revenue recognition and update them at the end of each reporting period as additional information becomes available.

Our reader and gateway products are highly dependent on embedded software and cannot function without this embedded software. We account for the hardware and embedded software as a single performance obligation and recognize revenue when control is transferred.

Our customer contracts with multiple performance obligations generally include a combination of hardware products, standalone software, extended warranty, enhanced maintenance and support services. For these contracts, we account for individual performance obligations separately if they are distinct. We allocate the transaction price to the separate performance obligations on a relative standalone selling-price basis. In instances where the standalone selling price is not directly observable, such as when we do not sell the product or service separately, we determine the standalone selling price using one, or a combination of, the adjusted market assessment or expected cost-plus margin. We defer amounts allocated to extended warranty and enhanced maintenance sold with our reader and gateway products and recognize them on a straight-line basis over the term of the arrangement, which is typically from one to three years. We defer amounts allocated to support services sold with our reader and gateway products and recognize them when we transfer control of the promised services to our customers.

For NRE development agreements that involve significant production, modification or customization of our products, we generally recognize revenue over the performance period using the cost-input method because it best depicts the transfer of services to the customer. We receive payments under these agreements based on a billing schedule. Contract assets relate to our conditional right to consideration for our completed performance under these agreements. We record accounts receivable when the right to consideration becomes unconditional. For the periods presented in this report, our contract assets, deferred revenue and the value of unsatisfied performance obligations for NRE development agreements are not material.

If a customer pays consideration before we transfer a good or service under the contract, then we classify those amounts as contract liabilities or deferred revenue. We recognize contract liabilities as revenue when we transfer control of the promised goods or services to our customers.

Payment terms typically range from 30 to 120 days. We present revenue net of sales tax in our consolidated statements of operations. We include shipping charges billed to customers in revenue and the related shipping costs in cost of revenue.

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Practical Expedients and Exemptions: We expense sales commissions when incurred because we expect the amortization period to be one year or less. We record these costs within sales and marketing expenses. We do not disclose the value of unsatisfied performance obligations for (1) contracts with an original expected length of one year or less and (2) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

Product Warranties

We provide limited warranty coverage for most products, generally ranging from a period of 90 days to one year from the date of shipment. We record a liability for the estimated cost of these warranties based on historical claims, product failure rates and other factors when we recognize the related revenue. We review these estimates periodically and adjust our warranty reserves when actual experience differs from historical estimates or when other information becomes available. The warranty liability primarily includes the anticipated cost of materials, labor and shipping necessary to repair or replace the product. Accrued warranty costs in 2022, 2021 and 2020 were not material.

Leases

We determine whether an arrangement is or contains a lease at inception. Right-of-use, or ROU, assets represent our right to use an identified asset for the lease term. Lease liabilities represent our obligation to make lease payments arising from the lease. We recognize operating lease ROU assets and liabilities at commencement date based on the present value of future lease payments over the lease term. We use an incremental borrowing rate in determining the present value of future lease payments because our operating leases do not provide an implicit rate. Our incremental borrowing rate is based on a credit-adjusted risk-free rate, which best approximates a secured rate over a similar term of lease. We recognize lease expense for lease payments on a straight-line basis over the lease term. Our lease agreements may contain variable costs such as common area maintenance, insurance, real estate taxes or other costs. We expense variable lease costs on the consolidated statements of operations as incurred. Our lease agreements generally do not contain any residual value guarantees or restrictive covenants.

We have various noncancellable operating lease agreements for office, warehouse and research and development space in the U.S., China, Thailand, Brazil and Malaysia, with expiration dates from 2023 to 2029. Certain of these arrangements have free or escalating rent payment provisions and optional renewal and termination clauses that we factor into the classification and measurement of the lease when appropriate. These lease agreements typically include lease and non-lease components and are generally accounted for as a single lease component. We consider variable CAM expenses for real estate leases as non-lease components.

We do not record leases with an initial term of 12 months or less on our consolidated balance sheet; we instead recognize lease expense for these leases on a straight-line basis over the lease term.

Research and Development Costs

Research and development expense comprises primarily personnel expenses (salaries, benefits and other employee related costs) and stock-based compensation expense for our product-development personnel; external consulting and service costs; prototype materials; other new-product development costs; and an allocated portion of infrastructure costs which include occupancy, depreciation and software costs.

Foreign Currency

We consider our foreign subsidiaries to be extensions of the U.S. Company. The functional currency of our foreign subsidiaries is the U.S. dollar. We include gains and losses resulting from remeasuring transactions denominated in currencies other than U.S. dollars in other income, net on the consolidated statements of operations.

Income Taxes

We use the asset and liability approach for accounting, which requires recognizing deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement and tax bases. We measure deferred tax assets and liabilities using enacted tax rates expected to be in effect when the assets and liabilities are recovered or settled. We recognize the effects of a change in tax rates on deferred tax assets and liabilities in the year of the enactment date. We determine deferred tax assets, including historical net operating losses and deferred tax liabilities, based on temporary differences between the book and tax bases of the assets and liabilities. We believe that it is currently more likely than not that our deferred tax assets will not be realized and, as such, we have recorded a full valuation allowance for these assets. We evaluate the likelihood of our ability to realize deferred tax assets in future periods on a quarterly basis, and if evidence indicates we will be able to realize some or all of our deferred tax assets then we will revise our valuation allowance accordingly.

We use a two-step approach for evaluating uncertain tax positions. First, we evaluate recognition, which requires us to determine if the weight of available evidence indicates that a tax position is more likely than not to be sustained upon audit, including resolution of related appeals or litigation processes. If we consider a tax position more likely than not to be unsustainable, then no benefits of the position are recognized. Second, we measure the uncertain tax position based on the largest amount of benefit which is more likely than not to be realized on effective settlement. This process involves estimating our actual current tax exposure, including assessing the risks associated with tax audits, together with assessing temporary differences resulting from the different treatment of items for tax and financial reporting purposes. If actual results differ from our estimates, then our net operating loss and credit carryforwards could be materially impacted.

Us realizing the benefits of the NOLs and credit carryforwards depends on sufficient taxable income in future years. We have established a valuation allowance against the carrying value of our deferred tax assets, as it is currently more likely than not we will be unable to realize these deferred tax assets. In addition, using NOLs and credits to offset future income subject to taxes may be subject to substantial annual limitations due to the “change in ownership” provisions of the Code and similar state provisions. Events that cause limitations in the amount of NOLs that we may use in any one year include, but are not limited to, a cumulative ownership change of more than 50%, as defined by Code Sections 382 and 383, over a three-year period. Using our NOLs and tax credit carryforwards could be significantly reduced if a cumulative ownership change of more than 50% has occurred in our past or occurs in our future.

Stock-Based Compensation

We have various equity award plans (“Plans”) for granting share-based awards to employees, consultants and non-employee directors of the Company. The Plans provide for granting several available forms of stock compensation such as stock option awards, restricted stock units, or RSUs, RSUs with performance conditions, or PSUs, and RSUs with market and service conditions, or MSUs.

We measure stock-based compensation costs for all share-based awards at fair value on the measurement date, which is typically the grant date. We determine the fair value of stock options using the Black-Scholes option-pricing model, which considers, among other things, estimates and assumptions on the expected life of the options, stock price volatility and market value of the Company’s common stock. We determine the fair value of RSUs and PSUs based on the closing price of our common stock at grant date. Additionally, for awards with a market condition, we use a Monte Carlo simulation model to estimate grant date fair value, which takes into consideration the range of possible stock price of total stockholder return outcomes.

Net Loss per Share

We compute net loss per share by dividing net loss by the weighted-average number of shares of common stock outstanding. We have outstanding stock options, RSUs, PSUs, MSUs and an ESPP, each of which we include in our calculation of diluted net loss per share if their effect would be dilutive. We compute diluted net loss per share by considering all potential dilutive common stock equivalents outstanding for the period.

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We used the treasury stock method for calculating any potential dilutive effect of the conversion of the 2019 Notes on diluted net loss per share for the year ended December 31, 2020. Upon us adopting ASU 2020-06 using the modified retrospective transition method on January 1, 2021, we applied the “if-converted” method for calculating any potential dilutive effect of the conversion of the 2019 and 2021 Notes on diluted net loss per share for the years ended December 31, 2022 and 2021. For more information about the 2019 and 2021 Notes, please refer to Note 7 to our consolidated financial statements.

Recently Adopted Accounting Standards

In August 2020, the FASB issued guidance on debt with conversion and other options, or ASU 2020-06. This guidance eliminates the beneficial and cash-conversion accounting models for convertible instruments and amends the derivative scope exception for contracts in an entity’s own equity. Additionally, this guidance requires the application of the “if-converted” method to calculate the impact of convertible instruments on diluted earnings per share. We adopted ASU 2020-06 on January 1, 2021 using the modified retrospective transition method and accounted for our 2019 Notes on a whole-instrument basis. We recorded a \$29.3 million increase to long-term debt, a \$32.7 million decrease to additional paid-in capital and a \$3.4 million decrease to accumulated deficit on January 1, 2021. Interest expense decreased for the year ended December 31, 2021 compared with the years ended December 31, 2020 and December 31, 2019, respectively, as we no longer separate an equity component of the 2019 Notes and incur amortization of debt discount. We had no changes to net deferred tax liabilities, due to the decrease in deferred tax liability being offset by a corresponding increase in valuation allowance upon adoption.

We present our consolidated financial statements as of and for the year ended December 31, 2021, under ASU 2020-06. We have not adjusted the comparative prior reporting periods and continue to report them in accordance with our historical accounting policy.

Note 3. Fair Value Measurements

The following table presents the balances of assets measured at fair value on a recurring basis, by level within the fair value hierarchy, as of the dates presented (in thousands):

	December 31, 2022			December 31, 2021		
	Level 1	Level 2	Total	Level 1	Level 2	Total
Cash equivalents:						
Money market funds	\$ 14,620	\$ —	\$ 14,620	\$ 113,058	\$ —	\$ 113,058
Total cash equivalents	14,620	—	14,620	113,058	—	113,058
Short-term investments:						
U.S. government agency securities	—	78,621	78,621	—	4,066	4,066
Corporate notes and bonds	—	26,953	26,953	—	36,966	36,966
Commercial paper	—	24,073	24,073	—	16,489	16,489
Treasury bill	—	11,359	11,359	—	4,490	4,490
Yankee bonds	—	1,939	1,939	—	—	—
Agency bonds	—	2,882	2,882	—	—	—
Asset-backed securities	—	8,321	8,321	—	7,432	7,432
Total short-term investments	—	154,148	154,148	—	69,443	69,443
Long-term investments:						
U.S. government agency securities	—	13,462	13,462	—	14,225	14,225
Yankee bonds	—	1,869	1,869	—	—	—
Agency bonds	—	2,983	2,983	—	—	—
Asset-backed securities	—	886	886	—	—	—
Total long-term investments	—	19,200	19,200	—	14,225	14,225
Total	\$ 14,620	\$ 173,348	\$ 187,968	\$ 113,058	\$ 83,668	\$ 196,726

We did not have any Level 3 assets as of December 31, 2022 or 2021. We did not have any liabilities measured at fair value as of December 31, 2022 or 2021. We expect short-term investments to mature within 1 year of the reporting date. We expect long-term investments to mature between 1 and 2 years from the reporting date. See Note 7 for the carrying amount and estimated fair value of our convertible senior notes due 2027.

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The following tables present the cost or amortized cost, gross unrealized gains, gross unrealized losses and total estimated fair value of our financial assets as of the dates presented (in thousands):

Description:	December 31, 2022			
	Cost or Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Total Estimated Fair Value
Money market funds	\$ 14,620	\$ —	\$ —	\$ 14,620
U.S. government agency securities	93,065	—	(982)	92,083
Corporate notes and bonds	27,133	6	(186)	26,953
Yankee bonds	3,815	—	(7)	3,808
Commercial paper	24,073	—	—	24,073
Treasury bill	11,361	2	(4)	11,359
Agency bond	5,863	4	(2)	5,865
Asset-backed securities	9,287	2	(82)	9,207
Total	<u>\$ 189,217</u>	<u>\$ 14</u>	<u>\$ (1,263)</u>	<u>\$ 187,968</u>

Description:	December 31, 2021			
	Cost or Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Total Estimated Fair Value
Money market funds	\$ 113,058	\$ —	\$ —	\$ 113,058
U.S. government agency securities	18,314	—	(23)	18,291
Corporate notes and bonds	36,975	3	(12)	36,966
Commercial paper	16,489	—	—	16,489
Treasury bill	4,494	—	(4)	4,490
Asset-backed securities	7,435	—	(3)	7,432
Total	<u>\$ 196,765</u>	<u>\$ 3</u>	<u>\$ (42)</u>	<u>\$ 196,726</u>

Marketable securities in a continuous loss position for less than 12 months had an estimated fair value of \$125.6 million and unrealized losses of \$1.2 million as of December 31, 2022. Marketable securities in a continuous loss position for less than 12 months had an estimated fair value of \$61.0 million and unrealized losses of \$42,000 as of December 31, 2021. Marketable securities in a continuous loss position for greater than 12 months had an estimated fair value of \$13.9 million and unrealized losses of \$0.1 million as of December 31, 2022. As of December 31, 2021, there were no marketable securities in a continuous loss position for greater than 12 months.

Unrealized losses from our fixed-income securities are primarily attributable to changes in interest rates and not to lower credit ratings of the issuers. In determining whether an unrealized loss is other-than-temporary, for the periods presented, we determined we do not have plans to sell the securities nor is it more likely than not that we would be required to sell the securities before their anticipated recovery.

Note 4. Inventory

The following table presents the detail of inventories as of the dates presented (in thousands):

	December 31, 2022	December 31, 2021
Raw materials	\$ 14,678	\$ 6,305
Work-in-process	14,525	7,873
Finished goods	17,194	7,780
Total inventory	<u>\$ 46,397</u>	<u>\$ 21,958</u>

Note 5. Property and Equipment

The following table presents property and equipment details as of the dates presented (in thousands):

	December 31, 2022	December 31, 2021
Machinery and equipment	\$ 48,420	\$ 32,159
Computer equipment and software	3,308	2,991
Furniture and fixtures	1,303	1,138
Equipment acquired under finance leases	2,895	2,960
Leasehold improvements	10,684	10,513
Total property and equipment, gross	66,610	49,761
Less: Accumulated depreciation	(27,583)	(22,261)
Total property and equipment, net	\$ 39,027	\$ 27,500

Depreciation expense, which includes amortization of finance lease assets, was \$6.0 million, \$4.6 million and \$4.5 million for the years ended December 31, 2022, 2021 and 2020, respectively. We did not acquire any property and equipment under finance leases for the year ended December 31, 2022. The net book value of property and equipment acquired under finance leases was \$0.2 million at December 31, 2021.

Note 6. Income Taxes

We are subject to federal and state income taxes in the United States and foreign jurisdictions.

The following table presents U.S. and foreign components of income (loss) before income taxes (in thousands):

	Year Ended December 31,		
	2022	2021	2020
U.S.	\$ (24,508)	\$ (51,488)	\$ (52,343)
Foreign	391	381	509
Loss before income taxes	<u>\$ (24,117)</u>	<u>\$ (51,107)</u>	<u>\$ (51,834)</u>

The following table presents the detail of income tax benefit (expense) for the periods presented (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Current:			
U.S. - Federal	\$ —	\$ —	\$ —
U.S. - State	(68)	(8)	(56)
Foreign	(110)	(137)	(76)
	<u>(178)</u>	<u>(145)</u>	<u>(132)</u>
Deferred:			
U.S. - Federal	5	(7)	32
U.S. - State	(11)	(1)	11
Foreign	—	—	—
	<u>(6)</u>	<u>(8)</u>	<u>43</u>
Total income tax expense	<u>\$ (184)</u>	<u>\$ (153)</u>	<u>\$ (89)</u>

We have not recorded a liability for U.S. income taxes and foreign withholding taxes on the undistributed earnings of foreign subsidiaries as of December 31, 2022 because we intend to permanently reinvest the earnings outside the United States. We expect the amount of the unrecognized deferred tax liability, if incurred, to be immaterial.

The following table presents a reconciliation of the federal statutory rate and our effective tax rate for the periods presented:

	Year Ended December 31,		
	2022	2021	2020
U.S. Statutory Rate	21.0%	21.0%	21.0%
Change in valuation allowance	(54.7)	(33.3)	(23.6)
State taxes (net of federal benefit)	0.4	0.2	(0.4)
Federal research and development credit	16.5	8.5	3.9
Stock-based compensation	16.1	10.2	0.2
Inducement premium	5.0	(4.7)	—
Unrecognized tax benefits	(4.1)	(2.1)	(1.1)
Other, net	(1.0)	(0.1)	(0.2)
Effective income tax rate	<u>(0.8%)</u>	<u>(0.3%)</u>	<u>(0.2%)</u>

We continue to maintain a full valuation allowance against our net deferred tax assets in the U.S. but recognize deferred income tax expense (benefit) due to the change in the indefinite deferred tax liability related to goodwill, which is partially offset by indefinite tax attributes.

Deferred federal, state and foreign income taxes reflect the net tax impact of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and for tax purposes. The following

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table presents the significant components of our deferred tax assets and liabilities as of the dates presented (in thousands):

	December 31, 2022	December 31, 2021
Net operating loss carryforwards	\$ 53,157	\$ 58,673
Credit carryforwards	16,868	13,879
Capitalized research and development	17,072	857
Operating lease liabilities	3,011	3,425
Allowances	1,398	859
Deferral of employer taxes	—	111
Deferred revenue	74	50
Stock-based compensation	6,041	6,762
Disallowed interest expense	676	768
Inventory cost capitalization	791	506
Other	—	23
Deferred tax assets	99,088	85,913
Less: Valuation allowance	(95,710)	(82,461)
Net deferred tax assets	<u>3,378</u>	<u>3,452</u>
Deferred tax liability:		
Goodwill	(796)	(744)
Depreciation and amortization	(475)	(336)
Operating lease ROU assets	(2,226)	(2,485)
Deferred tax liabilities	(3,497)	(3,565)
Net deferred tax liability	<u>\$ (119)</u>	<u>\$ (113)</u>

Realizing deferred tax assets depends on us generating future taxable income, the timing and amount of which are uncertain. We have provided a full valuation allowance against the net deferred tax assets as of December 31, 2022 and 2021 because, based on the weight of available evidence, it is more likely than not we will be unable to realize the deferred tax assets.

We have accumulated federal tax losses of approximately \$249.3 million and \$274.7 million, respectively, as of December 31, 2022 and 2021, which are available to reduce future taxable income. The Tax Cuts and Jobs Act, or TCJA, enacted on December 22, 2017 altered the carryforward period for federal net operating losses and as a result, all net operating losses generated in 2018 and forward have an indefinite life. Of the net operating losses reported, we have accumulated \$141.8 million with an indefinite life as of December 31, 2022. We have accumulated state tax losses of approximately \$21.7 million and \$23.3 million as of December 31, 2022 and 2021, respectively. We also have net research and development credit carryforwards of \$22.3 million and \$18.3 million as of December 31, 2022 and 2021, respectively, which are available to reduce future tax liabilities.

The Tax Cuts and Jobs Act contained a provision which requires the capitalization of Section 174 costs incurred in the years beginning on or after Jan. 1, 2022. Section 174 costs are expenditures which represent research and development costs that are incident to the development or improvement of a product, process, formula, invention, computer software or technique. This provision changes the treatment of Section 174 costs such that the expenditures are no longer allowed as an immediate deduction but rather must be capitalized and amortized. We have included the impact of this provision, which results in a deferred tax asset of approximately \$16.7 million as of December 31, 2022.

Our pre-2018 federal tax losses and research and development credit carryforwards began expiring in 2020. Under Sections 382 and 383 of the Internal Revenue Code, if a corporation undergoes an ownership change, then the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes, such as research tax credits, to offset its post-change income or income tax liability may be limited. We have completed a formal IRC Section 382 study through December 31, 2022 and the disclosed attributes reflect the conclusion of that study. However, subsequent ownership changes may affect the limitation in future years.

We are currently not under audit in any tax jurisdiction. Tax years from 2003 through 2022 are currently open for audit by federal and state taxing authorities.

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We establish reserves for tax positions based on estimates of whether, and the extent to which, additional taxes will be due. We establish the reserves when we believe that our tax-return positions might be challenged by taxing authorities, despite our belief that our tax return positions are fully supportable.

The following table presents the total balance of unrecognized tax benefits as of the dates presented (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Balance at beginning of period	\$ 4,609	\$ 3,519	\$ 3,428
Gross increase to tax positions in prior periods	—	—	(417)
Gross increase to tax positions in current periods	997	1,090	508
Balance at end of period	<u>\$ 5,606</u>	<u>\$ 4,609</u>	<u>\$ 3,519</u>

As of December 31, 2022, we recorded a total amount of unrecognized tax benefit of \$5.6 million as a reduction to the deferred tax asset. If recognized, this tax benefit would have no impact to our effective tax rate because we have a full valuation allowance. We do not anticipate that the amount of existing unrecognized tax benefit will significantly increase or decrease within the next 12 months. We record accrued interest and penalties related to unrecognized tax benefits as income tax expense and their value is zero.

Note 7. Long-term debt

Convertible Senior Notes

The following table presents the outstanding principal amount and carrying value of the Notes as of the dates indicated (in thousands):

	December 31, 2022			December 31, 2021		
	Principal Amount	Unamortized debt issuance costs	Net Carrying Amount	Principal Amount	Unamortized debt issuance costs	Net Carrying Amount
2019 Notes ⁽¹⁾⁽²⁾	\$ —	\$ —	\$ —	\$ 9,850	\$ (217)	\$ 9,633
2021 Notes	287,500	(7,256)	280,244	287,500	(8,839)	278,661
Total Debt	<u>287,500</u>	<u>(7,256)</u>	<u>280,244</u>	<u>297,350</u>	<u>(9,056)</u>	<u>288,294</u>
Short-term Debt	—	—	—	9,850	(217)	9,633
Long-term Debt	\$ 287,500	\$ (7,256)	\$ 280,244	\$ 287,500	\$ (8,839)	\$ 278,661

(1) In November 2021, we completed a privately negotiated repurchase of \$76.4 million principal amount of the 2019 Notes which we accounted for as an induced conversion in accordance with Accounting Standards Codification 470-20, Debt with Conversion and Other Options (ASC 470-20). As a result of this transaction, we recorded unamortized debt issuance costs of \$1.8 million in additional paid-in capital for the year ended December 31, 2021. Please refer to section "Repurchase of the Convertible Senior Notes – 2019".

(2) In June 2022, we completed a repurchase of \$9.85 million of the remaining principal amount of the 2019 Notes which we accounted for as an induced conversion in accordance with Accounting Standards Codification 470-20, Debt with Conversion and Other Options (ASC 470-20). As a result of this transaction, we recorded unamortized debt issuance costs of \$199,000 in additional paid-in capital for the year ended December 31, 2022. Please refer to section "Repurchase of the Convertible Senior Notes – 2019".

In December 2019, we issued \$86.3 million aggregate principal amount of the 2019 Notes and in November 2021, we issued \$287.5 million aggregate principal amount of the 2021 Notes (collectively, the Notes).

Further details of the Notes are as follows:

Issuance	Maturity Date	Interest Rate	First Interest Payment Date	Effective Interest Rate	Semi-Annual Interest Payment Dates	Initial Conversion Rate per \$1,000 Principal	Initial Conversion Price	Number of Shares (in millions) ⁽¹⁾
2019 Notes	December 15, 2026	2%	June 15, 2020	2.47%	June 15; December 15	28.9415	\$ 34.55	N/A
2021 Notes	May 15, 2027	1.125%	May 15, 2022	1.72%	May 15; November 15	9.0061	\$ 111.04	2.6

(1) We repurchased the 2019 Notes in November 2021 (\$76.4 million) and June 2022 (\$9.85 million).

The Notes are senior unsecured obligations, do not contain any financial covenants and are governed by indentures (the Indentures). The total net proceeds from the 2019 and 2021 Notes, after deducting initial debt

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issuance costs, fees and expenses, were \$83.5 million and \$278.4 million, respectively. We used a portion of the 2019 Notes proceeds to pay the cost of the capped call transactions described in the section “*Capped Calls*” and to repay our senior credit facility in 2019. We used approximately \$183.6 million of the 2021 Notes net proceeds, excluding accrued interest, to repurchase approximately \$76.4 million aggregate principal amount of the 2019 Notes through individual privately negotiated transactions concurrent with us offering the 2021 Notes. We used approximately \$17.6 million, excluding accrued interest, to repurchase the remaining \$9.85 million aggregate principal amount of the 2019 Notes in June 2022. Please refer to the section “*Repurchase of the Convertible Senior Notes - 2019*” for further details of both transactions. We will use the remainder of the net proceeds from the 2021 Notes for general corporate purposes.

Terms of the 2021 Notes

The Notes holders may convert their respective Notes at their option at any time prior to the close of business on the business day immediately preceding the respective conversion dates under the following circumstances:

- during any fiscal quarter commencing after the fiscal quarter ending on March 31, 2022 for the 2021 Notes (and only during such fiscal quarter), if the last reported sale price of our common stock, for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on, and including, the last trading day of the immediately preceding fiscal quarter is greater than or equal to 130% of the conversion price on each applicable trading day;
- during the five business day period after any five consecutive trading day period in which the trading price per \$1,000 principal amount of the Notes for each trading day was less than 98% of the product of the last reported sale price of our common stock and the conversion rate on each such trading day;
- prior to the close of business on the second scheduled trading day immediately preceding the redemption date if we call the Notes for redemption; or
- upon the occurrence of specified corporate events, as described in the indenture.

None of the circumstances described in the paragraphs above were met during fiscal year 2022.

Regardless of the foregoing circumstances, holders may convert all or any portion of the Notes, in increments of \$1,000 principal amount, on or after February 15, 2027, until the close of business on the second scheduled trading day immediately preceding the maturity date.

We may redeem all or a portion of the Notes for cash, at our option, on or after November 20, 2024, if the last reported sale price of our common stock has been at least 130% of the conversion price at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period at a redemption price equal to 100% of the principal amount of the Notes being redeemed, plus any accrued and unpaid interest to, but excluding, the redemption date.

Notes holders who convert their Notes in connection with certain corporate events that constitute a make-whole fundamental change (as defined in the indenture) are, under certain circumstances, entitled to an increase in the conversion rate. Additionally in the event of a corporate event constituting a fundamental change (as defined in the indenture), Notes holders may require us to repurchase all or a portion of their Notes at a repurchase price equal to 100% of the principal amount of the Notes being repurchased, plus any accrued and unpaid interest to, but excluding, the repurchase date.

Accounting for the Notes

Prior to January 1, 2021, we separated the 2019 Notes into liability and equity components.

We determined the fair value of the liability component to be \$52.5 million calculated as the present value of future cash flows discounted at the borrowing rate for a similar nonconvertible debt instrument based on the expected term. We determined the borrowing rate to be 9.90% based on the market rates for nonconvertible debt instruments issued by other companies with publicly available credit ratings considered to be comparable to us. We recognized the excess of the principal amount of the 2019 Notes over the initial carrying amount of the liability component as a debt discount of \$33.8 million and amortized it to interest expense over the expected term of the 2019 Notes using the effective interest rate method. We recorded the equity component of \$33.8 million as additional paid-in capital, calculated as the difference between the total proceeds of \$86.3 million and the initial carrying amount of the liability component.

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We allocated the 2019 Notes total issuance costs of \$2.8 million between liability and equity in the same proportion as the allocation of our total proceeds to liability and equity components. We amortized the issuance costs attributable to the liability component of \$1.7 million to interest expense over the respective term of the 2019 Notes using the effective interest rate method. We netted the issuance costs attributable to the equity component of \$1.1 million against the respective equity component in additional paid-in capital.

Effective January 1, 2021, we early adopted ASU 2020-06 using the modified retrospective approach. As a result, we accounted for the 2019 Notes as a single liability measured at amortized cost, as no other embedded features require bifurcation and recognition as derivatives. Upon adoption, we recorded a \$29.3 million increase to long-term debt, a \$32.7 million decrease to additional paid-in capital and a \$3.4 million decrease to accumulated deficit. We had no changes to net deferred tax liabilities with a decrease in deferred tax liability offset by a corresponding increase in valuation allowance upon adoption.

We accounted for the 2021 Notes issuance as a single liability measured at its amortized cost, as no other embedded features require bifurcation and recognition as derivatives. We presented the 2021 Notes total issuance costs of \$9.1 million as a direct deduction from the face amount of the 2021 Notes. We amortized the issuance costs to interest expense over the respective term of the 2021 Notes using the effective interest rate method.

Interest expense related to the Notes was as follows (in thousands):

	<u>Year Ended December 31, 2022</u>			<u>Year Ended December 31, 2021</u>			<u>Year Ended December 31, 2020</u>	
	<u>2019 Notes</u>	<u>2021 Notes</u>	<u>Total</u>	<u>2019 Notes</u>	<u>2021 Notes</u>	<u>Total</u>	<u>2019 Notes</u>	<u>Total</u>
Amortization of debt discount	\$ -	\$ -	\$ -	\$ —	\$ —	\$ —	\$ 3,566	\$ 3,566
Amortization of debt issuance costs	19	1,583	1,602	329	239	568	115	115
Cash interest expense	87	3,234	3,321	1,488	494	1,982	1,732	1,732
Total interest expense	<u>\$ 106</u>	<u>\$ 4,817</u>	<u>\$ 4,923</u>	<u>\$ 1,817</u>	<u>\$ 733</u>	<u>\$ 2,550</u>	<u>\$ 5,413</u>	<u>\$ 5,413</u>

Accrued interest related to the 2019 Notes as of December 31, 2021 was not material. Accrued interest related to the 2021 Notes as of December 31, 2022 and 2021 was \$404,000 and \$494,000, respectively. We record accrued interest in accrued liabilities in our consolidated balance sheet.

Our estimated fair value of the 2021 Notes was \$347.4 million and \$314.3 million as of December 31, 2022 and 2021, respectively, which we determined through consideration of quoted market prices. Our estimated fair value of the 2019 Notes was \$26.2 million as of December 31, 2021, which we determined through consideration of quoted market prices. The fair value for both Notes is classified as Level 2, as defined in Note 2.

Capped Calls

In connection with issuing the 2019 Notes, we entered into privately negotiated capped-call transactions with certain financial counterparties. The capped-call transactions are generally designed to reduce the potential dilution to our common stock upon any conversion or settlement of the 2019 Notes, or to offset any cash payments we are required to make in excess of the principal amount upon conversion of the 2019 Notes, as the case may be, with the reduction or offset subject to a cap based on the cap price. If, however, the market price per share of our common stock exceeds the cap price of the capped-call transactions, then our stock would experience some dilution and/or the capped call would not fully offset the potential cash payments, in each case, to the extent then-market price per share of our common stock exceeds the cap price. The initial cap price of the capped call transactions is \$54.20 per share, which represents a 100% premium over the last reported sale price of our common stock of \$27.10 per share on December 11, 2019 subject to certain adjustments under the terms of the capped call transactions. The capped call transactions expire over 40 consecutive scheduled trading days ending on December 11, 2026.

The capped call transactions meet the criteria for classification in equity, are not accounted for as derivatives and are not remeasured each reporting period. We paid \$10.1 million for the capped-call transactions, which we recorded as a reduction to additional paid-in-capital within shareholders' equity.

Repurchase of the Convertible Senior Notes – 2019

In November 2021 and June 2022, we completed a privately negotiated induced conversion of \$76.4 million and \$9.85 million principal amount, respectively of the 2019 Notes. We accounted for the 2019 Notes Repurchase transactions as induced conversions in accordance with Accounting Standards Codification 470-20, Debt with Conversion and Other Options (ASC 470-20). In connection with the induced conversions, we paid approximately \$183.6 million in cash in November 2021 and \$17.6 million in cash in June 2022, and also paid accrued and unpaid interest thereon. As a result of the induced conversion, we recorded \$11.3 million in November 2021 and \$2.2 million in June 2022 in induced conversion expense which is included in the Consolidated Statements of Operations. The induced conversion expense represents the fair value of the consideration issued upon conversion in excess of the fair value of the securities issuable under the original terms of the 2019 Notes. We accounted for the remaining cash consideration under the original terms of the 2019 Notes under the general conversion accounting guidance, where the difference between the carrying amount of the 2019 Notes retired, including unamortized debt issuance costs of \$1.8 million in November 2021 and \$199,000 in June 2022, and the cash consideration paid, was recorded in additional paid-in capital.

Note 8. Stockholders' Equity

Preferred Stock

Our board of directors has the authority to fix the designations, powers, preferences and rights and the qualifications, limitations or restrictions thereof, of any wholly unissued series of preferred stock, and to increase or decrease the number of shares in any series of preferred stock, subject to limitations prescribed by law and by our certificate of incorporation. We had no preferred stock issued and outstanding as of December 31, 2022 or 2021.

Common Stock

As of December 31, 2022, we had authorized 495,000,000 shares of voting \$0.001 par value common stock. Each holder of the common stock is entitled to one vote per common share. At its discretion, the board of directors may declare dividends on shares of common stock, subject to the prior rights of our preferred stockholders, if any. Upon liquidation or dissolution, holders of common stock will receive distributions only after preferred stock preferences have been satisfied.

Note 9. Stock-Based Awards

Stock-Based Compensation Expense

The following table presents the detail of stock-based compensation expense amounts included in our consolidated statements of operations for the periods presented (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Cost of revenue	\$ 1,522	\$ 1,869	\$ 1,015
Research and development expense	17,961	17,170	10,314
Sales and marketing expense	9,447	9,496	5,981
General and administrative expense	13,513	11,963	8,365
Total stock-based compensation expense	<u>\$ 42,443</u>	<u>\$ 40,498</u>	<u>\$ 25,675</u>

2016 Equity Incentive Plan

In June 2016, our board of directors adopted and our stockholders approved our 2016 Equity Incentive Plan, or the 2016 Plan, which became effective in July 2016 at which time the 2010 Equity Incentive Plan, or the 2010 Plan, was terminated. Our 2000 Stock Plan was terminated in March 2010. The number of shares of common stock reserved for issuance under the 2016 Plan may increase on January 1 of each year, beginning on January 1, 2017 and ending on and including January 1, 2026, by the lesser of (1) 1,825,000 shares; (2) 5% of the total number of shares of common stock outstanding on December 31 of the preceding calendar year; and (3) a lesser number of shares determined by our board of directors. The 2016 Plan provides for granting incentive or non-qualified stock options, restricted stock, restricted stock units, stock appreciation rights and performance shares or performance units to employees, non-employee directors and consultants.

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All options granted under the 2000 Stock Plan, the 2010 Plan and the 2016 Plan have a maximum 10-year term and generally vest and become exercisable over four years of continued employment or service as defined in each option agreement. We generally grant stock options with exercise prices that equal the fair value of the common stock on the date of grant. As allowed under the 2016 Plan, there are a few exceptions to this vesting schedule, which permit vesting at different rates or based on achieving performance targets. We use newly issued shares to satisfy option exercises. At December 31, 2022, we had approximately 2.0 million shares of common stock available for future grants.

Stock Options

The following table summarizes option award activity for the year ended December 31, 2022 (in thousands, except per share data and years):

	Number of Underlying Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Life (Years)	Total Intrinsic Value
Outstanding at December 31, 2021	2,288	\$ 24.53	6.65	\$ 146,827
Granted	—	—		
Exercised	(550)	22.56		
Forfeited or expired	(26)	29.07		
Outstanding at December 31, 2022	<u>1,712</u>	25.09	5.92	143,996
Vested and exercisable at December 31, 2022	1,466	\$ 24.38	5.70	\$ 124,287

We estimate the fair value of options granted at the date of grant using the Black-Scholes option-pricing model with the following assumptions for the periods presented:

	Year Ended December 31,		
	2022	2021	2020
Risk-free interest rate	N/A	0.8% - 1.2%	0.3% - 1.7%
Expected dividends yield	N/A	None	None
Expected volatility	N/A	71.2% - 72.4%	64.3% - 70.3%
Weighted-average expected term	N/A	6.08	6.08
Weighted-average fair value of options granted	N/A	\$ 36.94	\$ 16.56

We determined that it was not practicable to calculate the volatility of our share price because we do not have an extensive public trading history for shares of our common stock. Therefore, we estimated our volatility based on a combination of our historical volatility since becoming a publicly traded company and reported market value data for a group of publicly traded entities that we believe are relatively comparable after considering their size, stage of lifecycle, profitability, growth, risk and return on investment.

To determine the expected term, we generally apply and have historically applied the simplified approach in which the expected term of an award is presumed to be the mid-point between the vesting date and the expiration date of the options as we do not have sufficient historical exercise data to provide a reasonable basis for an estimate of expected term.

The total intrinsic value of options exercised during 2022, 2021 and 2020 was \$31.9 million, \$33.7 million and \$10.2 million, respectively. The total grant date fair value of options vested was \$7.0 million, \$12.8 million and \$11.7 million during 2022, 2021 and 2020, respectively.

As of December 31, 2022, our total unrecognized stock-based compensation cost related to unvested stock options was \$4.2 million, which we will recognize over the weighted-average remaining requisite service period of 1.2 years.

Restricted Stock Units

The following table summarizes activity for restricted stock units, or RSUs, RSUs with performance conditions, or PSUs, and RSUs with market and service conditions, or MSUs, for the year ended December 31, 2022 (in thousands, except per share data):

	Number of Underlying Shares			Weighted-Average Grant Date Fair Value		
	RSUs	MSUs	PSUs	RSUs	MSUs	PSUs
Outstanding at December 31, 2021	1,165	84	268	\$ 45.45	\$ 77.01	\$ 54.67
Granted	737	57	77	65.81	81.22	64.07
Vested	(478)	—	(269)	44.20	—	54.70
Forfeited	(114)	(31)	(2)	50.43	72.81	64.98
Outstanding at December 31, 2022	<u>1,310</u>	<u>110</u>	<u>74</u>	<u>\$ 56.92</u>	<u>\$ 80.40</u>	<u>\$ 64.03</u>

MSUs: We granted a total of 57,000 and 83,750 shares of MSUs to certain executives in 2022 and 2021, respectively. The MSUs are eligible to vest based on our total stockholder return (“TSR”) relative to the TSR of the constituents comprising the S&P Semiconductor Select Industry Index over two measurement periods as noted below.

For the 2022 MSUs: Half of the MSUs are eligible to vest based on our relative TSR during the period from January 1, 2022 through December 31, 2023, and half are eligible to vest based on our relative TSR during the period from January 1, 2022 through December 31, 2024.

For the 2021 MSUs: Half of the MSUs are eligible to vest based on our relative TSR during the period from January 1, 2021 through December 31, 2022, and half are eligible to vest based on our relative TSR during the period from January 1, 2021 through December 31, 2023.

We use a Monte Carlo simulation in estimating the MSU fair value at grant date and recognize compensation cost over the implied service period. We estimated the aggregate grant-date fair value of the 2022 and 2021 MSUs to be \$4.2 million and \$6.4 million, respectively using the Monte Carlo simulation valuation method. We recorded \$2.8 million and \$2.0 million of stock-based compensation expense related to the MSUs during 2022 and 2021, respectively. As of December 31, 2022, our total unrecognized stock-based compensation cost related to unvested MSUs was \$4.0 million, which we will recognize over the weighted-average period of 1.1 years.

PSUs: Since 2019, we have granted PSUs under our annual bonus program to our senior executives and other bonus-eligible employees. The number of annual PSUs that ultimately vest depends on us attaining certain financial metrics for the fiscal year as well as on the employee’s continued employment through the vesting date. The compensation committee and board of directors certified achievement of the financial metric for PSUs granted in 2021, vesting 268,000 shares in first-quarter 2022. Based upon attainment of the financial metric for 2022, we expect approximately 57,028 shares to vest in first-quarter 2023.

We record compensation expense for each period based on our estimate of the most probable number of PSUs that will vest, and we recognize the expense over the related service period. The stock-based compensation expense we recognized for PSUs was \$6.7 million and \$13 million for the years ended December 31, 2022 and 2021, respectively.

The total fair market value of RSUs vested was \$32.9 million during 2022 and \$18.2 million and \$5.0 million, respectively, during 2021 and 2020. The total fair value of PSUs vested was \$18.9 million during 2022 and \$15.4 million and \$7.5 million, respectively, during 2021 and 2020. We record the grant-date fair value of the outstanding RSUs as stock-based compensation expense over the vesting period. As of December 31, 2022, there was \$63.3 million of total unrecognized compensation cost related to unvested RSUs, which we expect to recognize over a weighted average period of 2.6 years. As of December 31, 2022, there was \$0.6 million of total unrecognized compensation cost related to PSUs, which we expect to recognize in less than one year.

Employee Stock Purchase Plan

Effective July 2016, we adopted the 2016 Employee Stock Purchase Plan, or the ESPP, allowing eligible employees to authorize payroll deductions of up to 15% of their eligible compensation. An ESPP participant may purchase a maximum of 4,000 shares, or a lesser number as determined by the IRS rules, each six-month period.

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The offering periods generally start on the first trading day on or after February 20 and August 20 of each year. Participants in an offering period are granted the right to purchase common shares at a price per share that is 85% of the lesser of the fair market value of the shares on (1) the first day of the offering period or (2) the end of the purchase period. The number of shares reserved for the ESPP may increase each year, beginning on January 1, 2017 and continuing through and including January 1, 2036, by the lesser of: (1) 1% of the total number of shares of common stock outstanding on the first day of each year; (2) 365,411 shares of common stock; and (3) an amount determined by our board of directors.

As of December 31, 2022, the total unrecognized stock-based compensation from the ESPP was \$0.2 million, which we will recognize on a straight-line basis over the weighted-average remaining service period of less than one year.

We estimate the fair value of the ESPP grant at the start of the offering period using the Black-Scholes option-pricing model with the following assumptions for the periods presented:

	Year Ended December 31,		
	2022	2021	2020
Risk-free interest rate	0.7% - 3.2%	0.0% - 0.1%	0.1% - 1.6%
Expected term	0.5 Years	0.5 Years	0.5 Years
Expected volatility	71.9% - 76.3%	61.0% - 65.8%	46.9% - 91.0%

Note 10. Leases

The following table presents the components of lease expense in our consolidated statements of operations for the periods presented (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Operating lease costs ^(a)			
Single lease costs	\$ 4,299	\$ 4,154	\$ 4,121
Variable lease costs	2,159	1,910	1,738
Sublease income ^(b)	(1,976)	(1,900)	(1,902)
Total operating lease costs	\$ 4,482	\$ 4,164	\$ 3,957

(a) Includes short-term lease costs, which are immaterial.

(b) Sublease income is related to unused office space that we sublet as part of the fiscal 2018 restructuring where we continue to have the primary obligations.

The following table presents supplemental cash flow information related to operating leases for the periods presented (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Cash paid for amounts included in the measurement of lease liabilities			
Operating cash flows used	\$ 5,097	\$ 4,895	\$ 4,755
Lease liabilities arising from remeasurement of right-of-use assets			
Operating leases	\$ —	\$ 698	\$ —
Lease liabilities arising from obtaining ROU assets			
Operating leases	\$ 2,237	\$ —	\$ —

The following table presents weighted-average remaining lease term and weighted-average discount rate related to operating leases as of:

	2022	2021
Weighted-average remaining lease term (years)	4.3	4.4
Weighted-average discount rate	6.9%	6.7%

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The following table presents future lease payments under operating leases as of December 31, 2022 (in thousands):

	Operating Leases		
	Lease Payments	Sublease Income	Net
2023	\$ 4,059	\$ (123)	\$ 3,936
2024	3,853	—	3,853
2025	3,919	—	3,919
2026	4,019	—	4,019
2027	623	—	623
Thereafter	1,191	—	1,191
Total lease payments	<u>\$ 17,664</u>	<u>\$ (123)</u>	<u>\$ 17,541</u>
Less: Imputed interest	(3,476)		
Present value of lease liabilities	14,188		
Less: Current portion of lease liabilities	3,122		
Lease liabilities, net of current portion	<u>\$ 11,066</u>		

Note 11. Commitments and Contingencies

Indemnification

In the normal course of business, we may enter into agreements that require us to indemnify either customers or suppliers for certain risks. Although we cannot estimate our maximum exposure under these agreements, to date indemnification claims have not had a material impact on our consolidated results of operations or financial condition.

Litigation

From time to time, we are subject to legal proceedings or claims in the ordinary course of business. We accrue a liability when management believes it is both probable that we have incurred a liability and we can reasonably estimate the amount of loss. For the year ended December 31, 2021, we recorded \$0.5 million in recovery costs related to settling the shareholder derivative action described below. For the year ended December 31, 2020, we recorded \$5.4 million of our paid settlement of a federal securities class action to general and administrative expenses. As of December 31, 2022 and 2021, we did not have accrued contingency liabilities. The following is a description of our significant legal proceedings. Although we believe that resolving these claims, individually or in aggregate, will not have a material adverse impact on our financial statements, these matters are subject to inherent uncertainties.

Shareholder Derivative Actions

On October 26, 2018, two shareholder derivative actions were filed in the U.S. District Court for the District of Delaware against our chief executive officer, former chief operating officer, former chief financial officer and certain of our directors. We were a nominal defendant. On November 8, 2018, a third shareholder derivative action was filed in this same court against the same defendants. Captioned *Weiss v. Diorio, et al., Fotouhi v. Diorio, et al., and De la Fuente v. Diorio, et al.*, the derivative complaints, purportedly brought on behalf of us, were premised on many of the allegations asserted in since-settled federal and state securities class actions and alleged that the defendants breached their fiduciary duties to us and allegedly made false or misleading statements and omissions of material fact in violation of Section 14(a) of the Securities Exchange Act regarding our business and operations. The derivative actions included claims for, among other things, unspecified damages in favor of us, corporate actions to purportedly improve our corporate governance and an award of costs and expenses to the derivative plaintiffs, including attorneys' fees. On January 28, 2019, the Delaware federal court entered a stipulated order that stayed these derivative actions until resolution of the pending federal securities class actions.

On July 10, 2020, following a private settlement mediation, the parties executed a stipulation of settlement to settle and resolve the claims in the consolidated derivative action. The settlement required us to implement certain corporate governance changes and to pay up to \$900,000 to plaintiffs' counsel for attorneys' fees and expenses. Our insurers agreed to contribute up to \$900,000 to plaintiffs' counsel for the attorneys' fees and expenses. On August 5, 2020, at the court's request, the parties filed supplemental briefings in respect of their joint motion for preliminary settlement approval. On February 26, 2021, the court entered an order preliminarily approving the settlement. On May 11, 2021, the court held a final approval hearing. On November 22, 2021, the Court issued an opinion and final order approving the settlement resolving the consolidated derivative actions and awarding plaintiffs' counsel less than half of the \$900,000 attorneys' fees and expenses noted above. The approximately \$0.5 million in savings from the contemplated final settlement of the derivative action was remitted by the insurer to us because we contributed \$5.4 million towards the federal securities class action due to exhaustion of our applicable insurance covering both the federal securities class action and the consolidated shareholder derivative actions.

Patent Infringement Claims and Counterclaims

Impinj Patent Infringement Claims Against NXP in California

On June 6, 2019, we filed a patent infringement lawsuit against NXP USA, Inc., a Delaware corporation and subsidiary of NXP Semiconductors N.V., or NXP, in the U.S. District Court for the Northern District of California, or the Court. Our original complaint alleged that certain NXP endpoint ICs infringe 26 of our U.S. patents. At the order of the Court, we filed an amended complaint limited to eight of the original 26 patents. We subsequently elected to go forward with asserting infringement of six of those eight patents. We are seeking, among other things, past damages, including lost profits; no less than a reasonable royalty; enhanced damages for willful infringement; and reasonable attorneys' fees and costs. We are also seeking an injunction against NXP making, selling, using, offering for sale or importing UCODE 8 and UCODE 9 ICs. NXP responded to our complaint on September 30, 2019 citing numerous defenses including denying infringement and claiming our asserted patents are invalid.

In February 2020, NXP filed petitions for *inter partes* review, or IPRs, with the Patent Trial and Appeal Board for the U.S. Patent and Trademark Office, or PTAB, against 12 of the originally asserted 26 patents, including the six patents asserted in the amended complaint. In August and September of 2020, the PTAB declined to institute review of four of the six asserted patents. On October 27, 2020, we filed a second amended complaint removing without prejudice the two of the six patents against which the PTAB instituted IPRs, leaving four patents in suit.

On September 24, 2020, the Court lifted a stay on two of the four patents in suit, and on July 23, 2021, the Court held a claim construction hearing for eight disputed claim terms in those two patents. On September 16, 2021, the Court issued a claim construction rejecting NXP's positions and adopting most of Impinj's positions relating to those disputed claim terms.

On September 3, 2021, the Court lifted the stay on the other two of the four patents in suit and scheduled a claim construction hearing for those two patents on March 4, 2022, issuing a claim construction order on those patents on March 21, 2022. Discovery has now closed and the parties have both filed various motions for summary judgment. Trial is scheduled for June 5, 2023.

NXP Patent Infringement Claims Against Impinj in Washington

On October 4, 2019, NXP USA, Inc. and NXP filed a patent infringement lawsuit against us in the U.S. District Court for the District of Delaware. The complaint alleged that certain of our products infringe eight U.S. patents owned by NXP or NXP USA, Inc. The plaintiffs are seeking, among other things, past damages adequate to compensate them for our alleged infringement of each of the patents-in-suit and reasonable attorneys' fees and costs. They are also seeking an injunction against us, enjoining continuing acts of infringement of the patents-in-suit. We have denied we are infringing any of the patents and we have asserted both that our wafer supplier is licensed under four of them and that all eight are invalid. On September 23, 2020, the District of Delaware granted Impinj's motion to transfer the case to the U.S. District Court for the Western District of Washington in Seattle.

On December 11, 2020, we moved to stay the case with respect to six of the eight patents in suit pending final resolution of IPR petitions we filed with the PTAB. On February 12, 2021, the Court granted our motion to stay the case as to these six patents. The PTAB instituted IPRs on two of the six challenged patents but denied them on the other four. The Court subsequently removed the stay on the four against which IPRs were not instituted.

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On March 9, 2021, we moved for summary judgment of noninfringement on the four patents to which we assert a license exists, including two patents that were not subject to a stay. On July 28, 2021, the Court deferred ruling on our motion for summary judgment pending further discovery. On September 17, 2021, the Court struck all scheduled dates for the case pending reassignment to a new judge. After the case was reassigned, the Court addressed both claim construction and our motion for summary judgment, issuing a claim construction order and granting our motion for summary judgment on the license defense on November 4, 2022. The case is now limited to three patents. Discovery has closed and both parties are currently briefing summary judgment and related motions. Trial is scheduled for April 10, 2023.

Impinj Patent Infringement Claims Against NXP in Texas

On May 25, 2021, we filed a new patent infringement lawsuit against NXP USA in the United States District Court for the Western District of Texas (Waco), asserting that NXP has infringed nine of our patents, including seven that we originally asserted in the Northern California case. The Court later granted our motion to amend to add two new NXP entities as defendants—NXP Semiconductor Netherlands B.V. and NXP B.V. Those defendants have moved to dismiss for lack of personal jurisdiction.

We are seeking among other things, past damages, including lost profits; no less than a reasonable royalty; enhanced damages for willful infringement; and reasonable attorney’s fees and costs. We are also seeking an injunction against NXP making, selling, using, offering for sale or importing its UCODE 7, 8 and 9 endpoint ICs.

On July 26, 2021, NXP filed an answer to our complaint and counterclaimed that we infringe nine patents, one of which NXP owns and eight of which NXP recently licensed from a third party. NXP has denied infringement, asserted our patents are invalid and asserted that some are unenforceable and/or subject to a license under our commitments to license “necessary” patents to certain standards.

A claim construction hearing was held on February 10, 2022 and fact discovery is scheduled to close on February 3, 2023. The Patent Office has instituted reexamination proceedings on five of the nine patents asserted by NXP and has issued a final office action rejecting all asserted claims on one of those patents. Trial is scheduled for September 25, 2023.

NXP Patent Infringement Claims Against Impinj in China

On December 7, 2020, Impinj Radio Frequency Technology (Shanghai) Co., Ltd., or Impinj Shanghai, was served with patent infringement lawsuits filed in the Intellectual Property Court in Shanghai, China, or Shanghai Intellectual Property Court, in which NXP B.V. asserted that certain of our products infringe three Chinese patents owned by NXP B.V., that closely correspond to three of the eight U.S. patents NXP asserted in the U.S. District Court described above. The plaintiffs are seeking, among other things, past damages and reasonable attorneys’ fees and costs. They are also seeking an injunction against us, enjoining continuing acts of infringement of the patents-in-suit. Impinj Shanghai objected to the jurisdiction of the Shanghai Intellectual Property Court and filed a motion to stay the proceedings. The jurisdictional challenge was rejected by the Shanghai court in March 2021; a subsequent appeal filed by Impinj Shanghai was denied before the IP Tribunal of the Supreme People’s Court in third-quarter 2021. Impinj, Inc. was formally served in July 2021, officially adding Impinj, Inc. to the suit.

On December 22, 2022, Impinj Shanghai filed invalidity requests against all three Chinese patents before the China National Intellectual Property Administration, or CNIPA. In July 2021, the CNIPA issued decisions upholding the validity of all three Chinese patents. In October 2021, Impinj Shanghai filed for judicial review of all the CNIPA decisions by the Beijing Intellectual Property Court, which has docketed its review for all three patents but has not yet set hearing dates. The Court has set a trial date of May 22, 2022 for all three patents. In December 2022, the Beijing Intellectual Property Court issued the first-instance administrative judgment, upholding the invalidity decision for one of the three Chinese patents. On January 11, 2023, Impinj Shanghai filed a subsequent appeal to the IP Tribunal of the Supreme People’s Court, which is pending. For the remaining two Chinese patent cases, the Beijing Intellectual Property Court has not yet set the trial date.

In May 2022, the Shanghai court held a hearing for all three patents, but the panel did not address the merits of any case in the hearing. In November 2022, we filed with the Shanghai court motions to dismiss two patent cases to which we assert a license defense (parallel to our arguments in Washington). Decisions on the motions are pending.

Obligations with Third-Party Manufacturers

We manufacture products with third-party manufacturers. We are committed to purchase \$87.9 million of inventory as of December 31, 2022.

Note 12. Deferred Revenue

Deferred revenue, comprising individually immaterial amounts for extended warranties, enhanced product maintenance and advance payments on NRE services contracts, represents contracted revenue that we have not yet recognized.

The following table presents the changes in deferred revenue for the indicated periods (in thousands):

	Year Ended December 31,	
	2022	2021
Balance at beginning of period	\$ 794	\$ 7,088
Deferral of revenue	3,143	981
Recognition of deferred revenue	(1,338)	(7,275)
Balance at end of period	<u>\$ 2,599</u>	<u>\$ 794</u>

During 2022, we recognized \$0.4 million revenue which we included in deferred revenue as of December 31, 2021. During 2021, we recognized \$6.7 million revenue which we included in deferred revenue as of December 31, 2020.

Note 13. Segment Reporting

We have one reportable and operating segment: the development and sale of our products and services. We identified our reportable segment based on how our chief operating decision-maker manages our business, makes operating decisions and evaluates our operating performance. Our chief executive officer acts as the chief operating decision-maker and reviews financial and operational information on an entity-wide basis. We have one business activity and there are no segment managers who are held accountable for operations, operating results or plans for levels or components. Accordingly, we have determined that we have a single reporting segment and operating unit structure.

Information by Revenue Categories

Our chief executive officer reviews information about our revenue categories, endpoint ICs and systems, the latter defined as reader ICs, readers, gateways and software. The following table presents our revenue categories for the indicated periods (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Endpoint ICs	\$ 191,532	\$ 139,250	\$ 102,326
Systems	66,268	51,033	36,597
Total revenue	<u>\$ 257,800</u>	<u>\$ 190,283</u>	<u>\$ 138,923</u>

Information by Geography

The following table summarizes our long-lived assets, comprising property and equipment, less accumulated depreciation (in thousands):

	<u>December 31, 2022</u>	<u>December 31, 2021</u>
United States	\$ 10,551	\$ 9,493
Malaysia	12,817	10,227
Taiwan	12,620	7,330
Others	3,039	450
Total	<u>\$ 39,027</u>	<u>\$ 27,500</u>

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Our geographic revenue in the following table are based on the location of the VARs, inlay manufacturers, reader OEMs, distributors or end users who purchased products and services directly from us. For sales to our resellers and distributors, their location may be different from the locations of the ultimate end users. The following table presents our sales by geography for the indicated periods (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Americas	\$ 57,129	\$ 38,021	\$ 30,962
Asia Pacific	168,249	133,152	98,483
Europe, Middle East and Africa	32,422	19,110	9,478
Total revenue	<u>\$ 257,800</u>	<u>\$ 190,283</u>	<u>\$ 138,923</u>

Total revenue in the United States, which is included in the Americas, was \$43.0 million, \$32.6 million and \$27.6 million for the years ended December 31, 2022, 2021 and 2020, respectively. Total revenue in China (and Hong Kong), which is included in Asia Pacific, was \$109.6 million, \$98.8 million and \$79.3 million for the years ended December 31, 2022, 2021 and 2020, respectively. Total revenue in Malaysia, which is included in Asia Pacific, was \$41.0 and \$23.6 million for the years ended December 31, 2022 and 2021, respectively. The Malaysia revenue was less than 10% of revenue for the year ended December 31, 2020. No sales to countries other than the United States, China and Malaysia accounted for more than 10% of revenue for the years ended December 31, 2022, 2021 and 2020.

Note 14. Net Loss per Share

For the periods presented, the following table provides a reconciliation of the numerator and denominator used in computing basic and diluted net loss per share (in thousands, except for per-share amounts):

	Year Ended December 31,		
	2022	2021	2020
Numerator:			
Net loss	\$ (24,301)	\$ (51,260)	\$ (51,923)
Denominator:			
Weighted-average shares outstanding — basic and diluted	25,539	24,176	22,819
Net loss per share — basic and diluted	<u>\$ (0.95)</u>	<u>\$ (2.12)</u>	<u>\$ (2.28)</u>

The following table presents the outstanding shares of our common stock equivalents excluded from the computation of diluted net loss per share as of the dates presented because their effect would have been antidilutive (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Stock options	1,712	2,288	3,061
RSUs, MSUs and PSUs	1,494	1,517	1,087
Employee stock purchase plan shares	26	42	73
2019 Notes	—	285	—
2021 Notes	2,589	2,589	—

We used the treasury stock method for calculating any potential dilutive effect of the conversion of the 2019 Notes on diluted net loss per share for the year ended December 31, 2020. Upon us adopting ASU 2020-06 using the modified retrospective transition method on January 1, 2021, we applied the “if-converted” method for calculating any potential dilutive effect of the conversion of the 2019 and 2021 Notes on diluted net loss per share for the year ended December 31, 2021.

Note 15. Related-Party Transactions

We have been party to a consulting agreement with a limited liability company owned by Cathal Phelan, a member of our board of directors, pursuant to which Mr. Phelan provided advisory and consulting services to us. The original term of the consulting agreement was May 2020 through December 2020. As mutually agreed by Mr. Phelan and us, we subsequently extended the term by 12 months to December 2021. In 2021 and 2022, again as mutually agreed by Mr. Phelan and us, we further extended the term in 12-month increments to December 2022 and 2023, respectively. We recognized and paid \$509,000 and \$499,000 in consulting fees to the limited liability company owned by Mr. Phelan for the years ended December 31, 2022 and 2021, respectively. Additionally, we granted 60,000 shares of stock options to Mr. Phelan on September 21, 2020 in connection with these consulting services, with 1/24th of the shares subject to the option vesting on October 21, 2020 and 1/24th of the shares subject to the option vesting on each month thereafter, subject to Mr. Phelan remaining a service provider. As part of the consulting agreement extension in 2022, we granted 8,000 RSUs to Mr. Phelan on October 1, 2022 with 1/4th of the RSUs vesting on January 1, April 1, July 1 and October 1, 2023, subject to Mr. Phelan remaining a service provider. On January 1, 2023, Mr. Phelan joined our company as Chief Innovation Officer and ceased to provide us with consulting services. Mr. Phelan remains on our board of directors.

Note 16. Retirement Plans

In 2001, we adopted a salary deferral 401(k) plan for our employees. The plan allows employees to contribute a percentage of their pretax earnings annually, subject to limitations imposed by the Internal Revenue Service, as well as a matching contribution, subject to certain limitations. We contributed \$1,435,000 and \$585,000 as matching contributions the years ended December 31, 2022 and 2021, respectively.

Note 17. Restructuring

On February 2, 2021, we restructured our go-to-market organization to strategically align our global sales, product, partner development and marketing teams. As part of the restructuring, we eliminated approximately seven full-time positions within our go-to-market organization, representing roughly 2% of our workforce. Restructuring charges were immaterial for the year ended December 31, 2022. We incurred restructuring charges of \$1.7 million for employee termination benefits as well as \$50,000 in other associated costs for legal expenses for the year ended December 31, 2021. We substantially completed our restructuring by June 30, 2021.

A summary of accrued restructuring costs as of December 31, 2022, is shown in the table below (in thousands):

	Employee Termination Benefits	Other Associated Costs	Total
Restructuring costs incurred in 2021	\$ 1,671	\$ 50	\$ 1,721
Cash payments in 2021	(1,080)	(50)	(1,130)
Cash payments in 2022	(489)	—	(489)
Restructuring costs adjustments in 2022	(102)	—	(102)
Accrued restructuring costs as of December 31, 2022	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>

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

Our management, including our chief executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022. Disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is (1) recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms and (2) accumulated and communicated to management, including its principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Based on the evaluation of our disclosure controls and procedures, our chief executive officer and principal financial officer concluded that our disclosure controls and procedures were effective at a reasonable assurance level as of December 31, 2022.

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 under Rule 13a-15(f) and 15d-15(f) under the Exchange Act. We evaluated the effectiveness of our internal control over financial reporting based on the framework in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on our evaluation, our management 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 Ernst & Young LLP, an independent registered public accounting firm, as stated in their report included herein.

Changes in Internal Control over Financial Reporting

There were no changes that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting during the three months ended December 31, 2022.

Limitations on Controls

Our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of achieving the desired control objectives. Our management recognizes that any control system, no matter how well designed and operated, is based upon certain judgments and assumptions and cannot provide absolute assurance that its objectives will be met. Similarly, an evaluation of controls cannot provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected.

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders

Impinj, Inc

Opinion on Internal Control Over Financial Reporting

We have audited Impinj, Inc.'s internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Impinj, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity and cash flows for each of the three years in the period ended December 31, 2022, and the related notes and our report dated February 13, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible 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 internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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.

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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.

/s/ Ernst & Young LLP

Seattle, Washington

February 13, 2023

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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 our definitive proxy statement relating to the 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the SEC within 120 days after the end of the 2022 fiscal year.

We have adopted a Code of Ethics that applies to our Chief Executive Officer, Chief Financial Officer, principal accounting officer and controller and persons performing similar functions. The Code of Ethics is posted on our website at <http://corporate-governance.impinj.com>. We intend to satisfy the disclosure requirements under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, a provision of the Code of Ethics by posting the information on our website at the address specified above.

Item 11. Executive Compensation

The information required by this item is incorporated by reference to our definitive proxy statement relating to the 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the SEC within 120 days after the end of the 2022 fiscal year.

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 our definitive proxy statement relating to the 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the SEC within 120 days after the end of the 2022 fiscal year.

Item 13. Certain Relationships and Related Transactions and Director Independence

The information required by this item is incorporated by reference to our definitive proxy statement relating to the 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the SEC within 120 days after the end of the 2022 fiscal year.

Item 14. Principal Accounting Fees and Services

The information required by this item is incorporated by reference to our definitive proxy statement relating to the 2023 annual meeting of stockholders. The definitive proxy statement will be filed with the SEC within 120 days after the end of the 2022 fiscal year.

PART IV

Item 15. Exhibits and Financial Statement Schedules*(a)(1) Financial Statements*

We have filed the financial statements listed in the Index to Consolidated Financial Statements as a part of this report.

(a)(2) Financial Statement Schedules

All financial statement schedules have been omitted because they are not applicable, not material or the required information is presented in the financial statements or the notes thereto.

(a)(3) Exhibits

The list of exhibits included in the Exhibit Index to this report is incorporated herein by reference.

NUMBER	DESCRIPTION	INCORPORATION BY REFERENCE		
		Form	Date	Number
3.1	Amended and Restated Certificate of Incorporation of Impinj, Inc., as filed with the Secretary of State of the State of Delaware on June 10, 2020	8-K	6/12/2020	3.1
3.2	Amended and Restated Bylaws of Impinj, Inc., adopted as of August 10, 2022	8-K	8/15/2022	3.1
4.1	Description of Impinj, Inc.'s Common Stock			
4.2	Specimen Common Stock Certificate of the registrant	S-1/A	7/11/2016	4.1
4.3	Amended and Restated Investors' Rights Agreement, dated July 13, 2012, by and among the registrant and the investors and founders named therein	S-1	6/2/2016	4.2
4.4	Indenture, dated as of November 5, 2021, between Impinj, Inc., and U.S. Bank National Association, as trustee	8-K	11/5/2021	4.6
4.5	Form of 1.125% Convertible Senior Notes due 2027 (included in Exhibit 4.4)	8-K	11/5/2021	4.6
10.1+	Form of Director and Executive Officer Indemnification Agreement	S-1/A	7/11/2016	10.1
10.2+	2000 Stock Plan, as amended	S-1	6/2/2016	10.2
10.3+	Form of Notice of Stock Option Grant and Stock Option Agreement permitting early exercise under the 2000 Stock Plan	S-1	6/2/2016	10.3
10.4+	2010 Equity Incentive Plan, as amended	S-1	6/2/2016	10.4
10.5+	Form of Notice of Stock Option Grant and Stock Option Agreement under the 2010 Equity Incentive Plan	S-1	6/2/2016	10.5

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10.6+	Form of Notice of Stock Option Grant and Stock Option Agreement permitting early exercise under the 2010 Equity Incentive Plan	S-1	6/2/2016	10.6
10.7+	2016 Equity Incentive Plan	S-1/A	7/11/2016	10.7
10.8+	Form of Notice of Stock Option Grant and Stock Option Agreement under the 2016 Equity Incentive Plan	S-1/A	7/11/2016	10.8
10.9+	2016 Employee Stock Purchase Plan	S-1/A	7/11/2016	10.9
10.10+	Amended and Restated Diorio Employment Agreement, dated December 19, 2008, between the registrant and Chris Diorio, Ph.D.	S-1	6/2/2016	10.12
10.11+	First Amendment to Diorio Employment Agreement, dated February 20, 2009, between the registrant and Chris Diorio, Ph.D.	S-1	6/2/2016	10.13
10.12+	Offer Letter, dated January 6, 2020, between the registrant and Cary Baker	10-K	3/2/2020	10.14
10.13	Office Lease, dated December 10, 2014, by and between the registrant and 400 Fairview LLC	S-1	6/2/2016	10.21
10.14A	First Amendment to Lease, dated July 31, 2015, between the registrant and 400 Fairview LLC	S-1	6/2/2016	10.21A
10.14B	Second Amendment to Lease, dated March 4, 2016, between the registrant and 400 Fairview LLC	S-1	6/2/2016	10.21B
10.14C	Third Amendment to Lease, dated March 28, 2016, between the registrant and 400 Fairview LLC	S-1	6/2/2016	10.21C
10.15	Office Lease, dated November 17, 2004, between the registrant and Bedford Property Investors, Inc., as amended by the First Amendment to Lease, dated July 21, 2006, by and between the registrant and Fremont Lake Union Center LLC and the Second Amendment to Lease, dated December 11, 2009, by and between the registrant and Fremont Lake Union Center LLC	S-1	6/2/2016	10.22
10.16†	<u>License Agreement, dated July 3, 2008, between the registrant and Intel Corporation</u>	10-Q	10/28/2020	10.1
10.17†	<u>Purchase Agreement—Services Phase 2, dated December 23, 2009, by and between the registrant and Intel Corporation</u>	10-Q	10/28/2020	10.2
10.18†	<u>Amendment No. 1 to Purchase Agreement—Services Phase 2, dated March 26, 2010, between the registrant and Intel Corporation</u>	10-Q	10/28/2020	10.3

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10.19†	Amendment No. 2 to Purchase Agreement—Services Phase 2, dated April 20, 2011, between the registrant and Intel Corporation	10-Q	10/28/2020	10.4
10.20†	Amendment No. 3 to Purchase Agreement—Services Phase 2, dated November 15, 2011, between the registrant and Intel Corporation	10-Q	10/28/2020	10.5
10.21†	Amendment No. 4 to Purchase Agreement—Services Phase 2, dated April 25, 2013, between the registrant and Intel Corporation	10-Q	10/28/2020	10.6
10.22†	Amendment No. 5 to Purchase Agreement—Services Phase 2, dated June 12, 2013, between the registrant and Intel Corporation	10-Q	10/28/2020	10.7
10.23+	Form of Notice of Restricted Stock Unit Grant and Restricted Stock Unit Agreement under the 2016 Equity Incentive Plan	10-Q	8/14/2017	10.1
10.24	Letter Agreement, dated as of June 20, 2018, among Impinj, Inc., Sylebra HK Company Limited, Sylebra Capital Management and Daniel P. Gibson	8-K	6/26/2018	10.1
10.25+	Executive Employment Agreement, dated April 28, 2017, between the registrant and Jeff Dossett	10-K	2/28/2020	10.32
10.26	Form of Capped Call Transaction Confirmation	8-K	12/16/2019	10.1
10.27+	Impinj, Inc. Amended and Restated Outside Director Compensation Policy, as amended May 26, 2022	10-Q	7/27/2022	10.1
10.28+	Executive Employment Agreement, dated November 13, 2018 between the registrant and Hussein Mecklai			
10.29+ ††	Executive Employment and Arbitration Agreement dated December 29, 2022 between the registrant and Cathal Phelan			
21.1	Subsidiaries of the registrant	S-1	6/2/2016	21.1
23.1	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm			
24.1	Powers of Attorney (contained on signature page)			
31.1	Certification of Principal Executive Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended			
31.2	Certification of Principal Financial Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended			

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32.1*	<u>Certification of Principal Executive Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350.</u>
32.2*	<u>Certification of Principal Financial Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350.</u>
101.INS	Inline XBRL Instance Document
101.SCH	Inline XBRL Taxonomy Extension Schema Linkbase Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Inline XBRL for the cover page of this Annual Report on Form 10-K, included in the Exhibit 101 Inline XBRL Document Set.
+	Indicates management contract or compensatory plan, contract or arrangement.
*	The certifications attached as Exhibits 32.1 and 32.2 that accompany this Annual Report on Form 10-K are not deemed filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of Impinj, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.
†	Certain portions of this exhibit have been omitted because they are not material and would likely cause competitive harm to the registrant if disclosed.
††	Certain portions of this exhibit have been omitted because they are not material and are of the type that the registrant treats as private or confidential.

Item 16. Form 10-K Summary

None.

SIGNATURES

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

Impinj, Inc.

Date: February 13,2023

By: /s/ Cary Baker**Cary Baker***Chief Financial Officer (Principal Financial and Accounting Officer)***POWER OF ATTORNEY**

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Chris Diorio, Ph.D. and Cary Baker, and each of them, with full power of substitution and resubstitution and full power to act without the other, as his or her true and lawful attorney-in-fact and agent to act in his or her name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file, any and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorneys-in-fact and agents or any of them or their and his or her substitute or substitutes, may lawfully do or cause to be done by virtue thereof.

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 in the capacities and in the capacities and on the dates indicated.

Name	Title	Date
<u>/s/Chris Diorio</u> Chris Diorio, Ph.D.	Chief Executive Officer and Vice Chair <i>(Principal Executive Officer)</i>	February 13,2023
<u>/s/ Cary Baker</u> Cary Baker	Chief Financial Officer <i>(Principal Financial and Accounting Officer)</i>	February 13,2023
<u>/s/ Steve Sanghi</u> Steve Sanghi	Chair	February 13,2023
<u>/s/ Gregory Sessler</u> Gregory Sessler	Director	February 13,2023
<u>/s/ Daniel Gibson</u> Daniel Gibson	Director	February 13,2023
<u>/s/ Umesh Padval</u> Umesh Padval	Director	February 13,2023
<u>/s/ Cathal Phelan</u> Cathal Phelan	Director	February 13,2023
<u>/s/ Meera Rao</u> Meera Rao	Director	February 13,2023

BOARD OF DIRECTORS**Chris Diorio**

Chief Executive Officer and
Vice Chair, Impinj, Inc.

Steve Sanghi

Board Chair, Impinj, Inc.
Executive Chairman,
Microchip Technology, Inc.

Dan Gibson

Chief Investment Officer,
Sylebra Capital Management

Umesh Padval

Venture Partner,
Thomvest Ventures

Cathal Phelan

Chief Innovation Officer,
Impinj, Inc.

Meera Rao

Former Semiconductor and
Finance Executive

Miron Washington

E-commerce, Global Supply
Chain Operations and Digital
Transformation Executive

Gregory Sessler

Former Biotechnology and
Finance Executive

EXECUTIVE OFFICERS**Chris Diorio, Ph.D.**

Chief Executive Officer and
Vice Chair

Hussein Mecklai

Chief Operating Officer

Cary Baker

Chief Financial Officer

Jeff Dossett

Chief Revenue Officer

Cathal Phelan

Chief Innovation Officer

CORPORATE HEADQUARTERS

400 Fairview Avenue North,
Suite 1200
Seattle, WA 98109

**INDEPENDENT REGISTERED
PUBLIC ACCOUNTING FIRM**

Ernst & Young LLP

TRANSFER AGENT

American Stock Transfer & Trust
Company, LLC

COMMON STOCK LISTING

The Nasdaq Global Select
Market

Ticker symbol: PI

IMPINJ INVESTOR RELATIONS

For news and other investor
information about Impinj, go to
our website at:

<https://investor.impinj.com/>

For additional biographical information on our directors and executive officers, see the sections of our proxy statement captioned “Nominees for Director” (starting on page 10), “Board of Directors and Corporate Governance” (starting on page 13) and “Executive Officers” (starting on page 28). A copy of our proxy statement is included with this annual report to stockholders.



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