



2023 ANNUAL REPORT

May 2023

Dear Shareholders:

Major Milestones in F2023

We achieved significant milestones during fiscal year 2023 (“F2023”) in our transformation into an AI edge processor company. On the financial front, despite the cyclical and economic challenges in the second half, we reported record annual revenue for the year. In addition, with the continued growth of our edge AI processors, our average selling price (“ASP”) rose and is expected to continue to rise. On the business front, we broadly sampled our CV3-AD central domain controller processor, announced key strategic partnerships with global automotive leaders, and took an important step toward commercialization of our automotive software stack IP. Though global economic and geopolitical challenges persist, we are excited about our momentum.

- Record revenue of \$337.6 million
- AI revenue exceeded 45% of total revenue, up from approximately 25% the prior year
- Sampled CV3-AD, a central domain controller for mobility applications that extends our AI processing reach from camera perception to include radar perception, fusion and planning
 - Introduced our centralized 4D imaging radar architecture
 - Announced key strategic relationships in the automotive market

Use of our Edge AI Products Continues to Grow in Multiple Markets

Our edge AI products continue to gain traction across our key IoT and vehicular markets. As of the end of F2023, we have cumulatively shipped more than 13 million computer vision (“CV”) processors to more than 325 unique customers. This includes mass production shipments in enterprise, public infrastructure, smart home and both passenger and commercial vehicle markets. Led by our CV2 product family, our edge AI products represented more than 45% of our total revenue in F2023 and are expected to grow to approximately 60% of total revenue in F2024. In IoT markets, we expect both enterprise and smart home security cameras to continue to transition to our AI processors, with applications including access control, fixed and mobile robotics and advanced video conferencing increasingly utilizing our AI processors. We also anticipate continued growth in our CV2 products in automotive applications, including for advanced driver assistance systems (“ADAS”). Though still in the early stages of design cycles, our CV3 family of AI processors has the potential to command significantly larger ASPs than our other products. The anticipated growth of our AI processors is expected to continue to drive our corporate ASP higher, which rose above \$10 in F2023.

Establishing Strategic Partnerships with Global Automotive Leaders

Less than six months after we began sampling our CV3 central domain controller, we announced adoption of the solution by key automotive tier-1 suppliers. In November, Continental announced that it would offer ADAS systems based on our CV3 SoC family. The joint ADAS solution, with its centralized, single-chip architecture, will enable the next generation of vehicles to more quickly perceive environmental conditions by processing multiple sensor inputs, simultaneously. In January 2024, we announced an extension of this relationship to include a collaboration for the development of a full software stack for ADAS and autonomous driving applications, with Ambarella’s software IP embedded in Continental’s full stack. In December, Bosch announced it plans to adopt the CV3 SoC family for its next generation ADAS functions. We are very excited about these relationships and look to expand upon them in F2024 and beyond.

Centralized Radar and CV3 Synergies

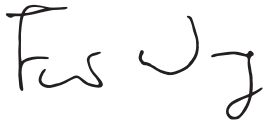
Our acquisition of Oculii Corp. in 2021 made us one of the few semiconductor companies to have in-house both advanced camera and high-definition radar technology development. Such capabilities provide us with cross-selling opportunities as well as the ability to market breakthrough levels of radar perception accuracy. In December, we expanded upon this opportunity in announcing our new centralized 4D imaging radar architecture. Combining Oculii adaptive AI radar software with the efficient CV3 AI central domain controller enables central processing and fusion of raw 4D imaging radar data with raw camera data, which we expect to enable greater environmental perception and safer path planning in AI-based level 2 to level 4 autonomous driving systems with significantly lower power consumption than competing solutions. We are very excited to demonstrate this breakthrough technology broadly to customers in F2024.

Building an AI Business in Turbulent Times

We believe our algorithm-first approach has enabled us to establish a differentiated and leadership position in the edge AI market. The megatrends of security, safety, automation, and eventually complete autonomy, or robotics, are key drivers in all our markets. With our AI technology, we have established new product cycles in existing markets and have developed solutions for entirely new markets in machine perception that we did not previously serve. While we are experiencing near-term pressure on our revenue from cyclical and economic factors, we firmly believe our secular growth opportunity remains very positive. AI is just beginning to transform so many industries, and we expect AI adoption to accelerate over the coming years, in particular in the AI edge inference market that is our area of focus.

I would like to express my gratitude to the entire Ambarella family – our employees and their families, our customers, our suppliers, and our shareholders. We could not be successful without your support.

Sincerely,

A handwritten signature in black ink, appearing to read "Fermi Wang". The signature is written in a cursive, fluid style.

Fermi Wang, President & CEO

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

FORM 10-K

(Mark One)

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

For the fiscal year ended January 31, 2023

OR

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

For the transition period from _____ to _____

Commission File Number: 001-35667

AMBARELLA, INC.

(Exact name of registrant as specified in its charter)

Cayman Islands
(State or other jurisdiction of
incorporation or organization)

3101 Jay Street
Santa Clara, California
(Address of principal executive offices)

98-0459628
(I.R.S. Employer
Identification No.)

95054
(Zip Code)

Registrant's telephone number, including area code: (408) 734-8888

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Ordinary Shares, \$0.00045 Par Value Per Share	AMBA	The Nasdaq Global Market

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

None

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

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

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months 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 financial 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

The aggregate market value of the voting and non-voting ordinary shares held by non-affiliates of the Registrant as of July 31, 2022, was approximately \$2.5 billion based upon the closing price reported for such date on the NASDAQ Global Market. For purposes of this disclosure, ordinary shares held by persons known to the Registrant (based on information provided by such persons and/or the most recent schedule 13Gs filed by such persons) to beneficially own more than 5% of the Registrant's ordinary shares and ordinary shares held by officers and directors of the Registrant have been excluded because such persons may be deemed to be affiliates. This determination is not necessarily a conclusive determination for other purposes.

Number of ordinary shares, \$0.00045 par value, outstanding as of March 24, 2023: 39,581,559 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information is incorporated into Part III of this report by reference to the Proxy Statement for the Registrant's annual meeting of shareholders to be held on or about June 8, 2023 to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act. The forward-looking statements are contained principally in, but not limited to, the sections titled “Business,” “Risk Factors,” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” as well as elsewhere in this Annual Report on Form 10-K. Forward-looking statements are identified by the use of the words “would,” “could,” “will,” “may,” “expect,” “believe,” “should,” “anticipate,” “outlook,” “if,” “future,” “intend,” “plan,” “estimate,” “predict,” “potential,” “target,” “seek,” “continue,” “foreseeable” or “forecast” and similar words and phrases, including the negatives of these terms, or other variations of these terms, that denote future events. Forward-looking statements include, but are not limited to, information concerning our possible or assumed future results of operations, competitive position, industry environment, potential growth opportunities and the effects of competition, our product development strategy and areas of focus, our market opportunity, our ability to develop new solutions, including our ability to integrate and apply acquired technologies to our solutions, our future financial and operating performance, sales and marketing strategy, investment strategy and the results of our investments, research and development, customer and supplier relationships, inventory levels, customer demand and our ability to secure design wins, industry trends, our cash needs and capital requirements, and expectations about seasonality, taxes, and operating expenses. These statements reflect our current views with respect to future events and our potential financial performance and are subject to risks and uncertainties that could cause our actual results and financial position to differ materially and adversely from what is projected or implied in any forward-looking statements included in this Annual Report on Form 10-K.

Factors that could affect such forward-looking statements include, but are not limited to, risks associated with revenue being generated from new customers or design wins, neither of which is assured; our ability to retain and expand customer relationships and to achieve design wins; economic factors beyond our control, including risks associated with high inflation and recessionary concerns; geopolitical factors beyond our control, including tensions between the United States and China and the ongoing hostility between Russia and Ukraine; the potential impact of the COVID-19 pandemic on our operations or the operations of our supply chain or our customers; our ability to timely produce sufficient quantities of our products on a cost-effective basis through our third-party vendors; the commercial success of our customers’ products; our growth strategy; our ability to anticipate future market demands and future needs and preferences of our customers; our ability to introduce new and enhanced solutions, including our ability to license software modules; the expansion of our current markets and our ability to successfully enter new markets; anticipated trends and challenges, including competition, in the markets in which we operate; our expectations regarding the adoption of computer vision technology; our ability to effectively generate and manage growth; our ability to retain key employees; the potential for intellectual property disputes or other litigation; the risks described under Item 1A of Part I—“Risk Factors,” Item 7 of Part II—“Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and elsewhere in this Annual Report on Form 10-K; and those discussed in other documents we file with the Securities and Exchange Commission. You are cautioned not to place undue reliance on the forward-looking statements, which speak only as of the date of this Annual Report on Form 10-K. We have no obligation (and expressly disclaim any such obligation) to update or alter any forward-looking statements, whether as a result of new information or otherwise except as otherwise required by securities regulations.

For purposes of this Annual Report, the terms “Ambarella”, “the Company”, “we”, “us” and “our” refer to Ambarella, Inc. and its consolidated subsidiaries.

PART I

ITEM 1. BUSINESS

Overview

Ambarella is a leading developer of low-power system-on-a-chip, or SoC, semiconductors and software for edge artificial intelligence, or AI, applications. Our technologies make electronic systems smarter, enabling features such as person detection, object classification, and analytics, in addition to performing complex data analysis in real time, delivering high quality imagery, and preserving vital system resources such as power and network bandwidth. We specialize in the development of deployable, scalable designs for intelligent electronic systems that utilize high-bandwidth sensors offering a proven path to mass production.

Incorporated in 2004, we have primarily served human-viewing applications with video and image processors for enterprise, public infrastructure and home applications, such as internet protocol, or IP, security cameras, sports cameras, wearables, aerial drones, and aftermarket automotive video recorders. We are now leveraging our human-viewing heritage to pursue the machine sensing market. Our recent development efforts have focused on creating advanced AI technology that enables edge devices to visually perceive the environment and make decisions based on the data collected from cameras and other types of sensors, such as 4D radar. This category of AI technology is known as computer vision, or CV, and our CV SoCs integrate our state-of-the-art video processor technology together with our recently developed deep learning neural network processing technology, which we refer to as CVflow®. The CVflow-architecture supports a variety of computer vision algorithms, including, object detection, classification and tracking, semantic and instance segmentation, image processing, stereo object detection, terrain mapping, and face recognition. In addition, CVflow can process other sensor modalities, including lidar, radar, time of flight, thermal and near infrared (NIR), and allows customers to differentiate their products by porting their own or third party neural networks and/or classical computer vision algorithms to our CVflow-based SoCs. Our CV technology is creating opportunities for us to address a broader range of markets and applications while also allowing us to capture more content per electronic system.

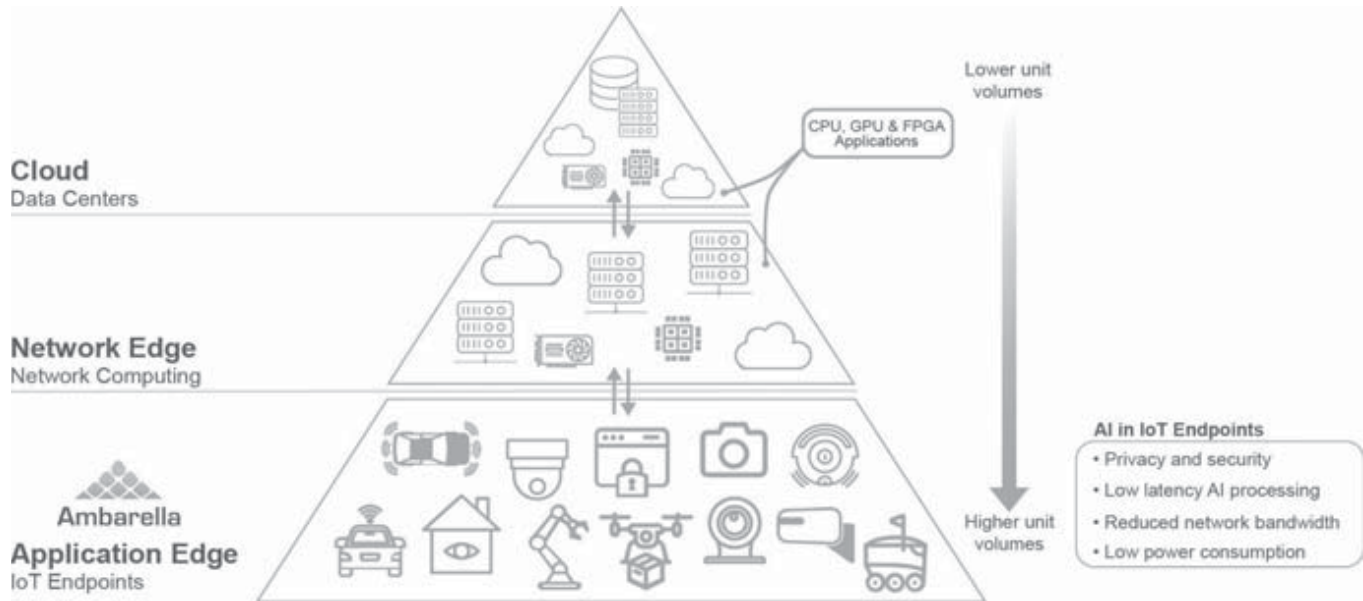
Our new CV3 AI central domain controller family of SoCs is specifically architected for automated driving applications. In addition to offering our existing advanced camera perception processing, CV3 adds sensor fusion and planning layers that enable a broader set of fully-automated devices.

In November 2021, we acquired Oculii Corp., a developer of high definition radar technology. Oculii's adaptive AI software algorithms are designed to enable radar perception using current production radar chips to achieve significantly higher resolution, longer range and greater accuracy. Oculii's software can be deployed on our existing CVflow SoCs, operating in conjunction with leading radar RF solutions to significantly increase safety and reliability. We recently introduced a centralized radar architecture that synergistically leverages Oculii's adaptive AI software algorithms together with our CV3 domain controller family, resulting in improved perception, lower power consumption and reduced bills-of-material for mobility applications compared to the current generation of radar systems utilized in the market today.

As described below, Ambarella's products are now used in a wide variety of human viewing and computer vision applications, including a variety of automotive camera systems, video security cameras, mobile and fixed robots, industrial applications, and consumer devices, such as action, drone and 360° cameras. For our fiscal years ended January 31, 2023, 2022 and 2021, we recorded revenue of \$337.6 million, \$331.9 million and \$223.0 million, respectively. For the fiscal years ended January 31, 2023, 2022 and 2021, we incurred net losses of \$65.4 million, \$26.4 million and \$59.8 million, respectively. We have generated cash from operations in each fiscal year starting from 2009.

Industry Background and Target Markets

Computer vision functionality has historically been executed with graphics processing units (GPU), field programmable gate-arrays (FPGA) or general purpose microprocessors (CPU) in servers or datacenters. This approach requires large amounts of data to be transported from an end-point electronic system or device into the network infrastructure, where the data may be stored, processed, and then sent back to the end point, creating added delay, power consumption and incremental expense from data communications, server processing and storage. In some applications, unacceptable levels of latency are introduced by the transportation of this data, minimizing or, in some cases, eliminating the utility of the product. In addition, this approach often requires personal information to be transmitted from the end-point device to the network infrastructure, potentially raising privacy and security concerns.



We believe the CV end-point market, sometimes referred to as the system’s edge, requires a fundamentally different SoC architecture versus the GPU, FPGA and CPU approach commonly used in the datacenter. Our CV SoCs are optimized for the requirements of the end-point market to provide highly accurate results, significant processing power, small form factor and minimal latency while consuming very low amounts of power and simultaneously delivering both human viewing and computer vision functionality, often while supporting multiple cameras and multiple AI applications with a single SoC incorporated in an end-point device. In addition, privacy and security can be enhanced, as critical personal information may not need to enter the network infrastructure.

Our first CV SoC was introduced in 2018 and CV3 is our third generation computer vision chip in our SoC family. Our development efforts are now focused on SoCs that provide both human viewing and computer vision functionality. With the acquisition of Oculii, we also now complement our advanced camera perception capabilities with advanced radar perception to enable higher levels of autonomy.

We are focusing on the automotive and Internet-of-Things (IoT) end markets:

- **Automotive Applications.** Cameras and other sensors, as well as high performance computing processors, are utilized for a variety of applications in the automotive market and our products are designed into both original equipment manufacturer (OEM) and aftermarket applications. We address the following automotive market applications:
 - **Automotive Video Recorders (also known as data loggers).** These video cameras are pre-installed in vehicles or mounted (aftermarket) to record events for reconciliation, such as for insurance and liability, driver scoring or training, and security purposes. We offer solutions for both OEM and aftermarket drive recording devices, some of which include advanced driver assistance systems (ADAS) features.
 - **Electronic Mirrors.** One or more cameras, in conjunction with an electronic display, are used to augment, or in some cases replace, reflective glass rear view and/or side view mirrors to provide a wider and unobstructed field of view. Smart electronic mirrors that incorporate our CV SoCs may also help with detecting objects in blind spots, overtaking vehicles and alerting for vulnerable road users, such as pedestrians and bicycles.
 - **Front Advanced Driver Assistance System (ADAS) Cameras.** These front-facing cameras are often positioned behind the rearview mirror, enabling functions such as automatic emergency braking, lane departure warning, forward collision warning, intelligent headlight control, and speed assistance functions, many of which are required by an increasing number of regional New Car Assessment Programs, or NCAP. The most advanced front ADAS cameras generally require ultra high-definition (UHD) resolution and advanced CV processing, which can be critical for long-distance object detection with a wide field-of-view, and extremely low power due to their inherently small form factor.

- **Cabin Monitoring System (CMS) and Driver Monitoring System (DMS) Cameras.** These interior mounted cameras track drivers and passengers to help prevent accidents by alerting a drowsy or distracted driver and assisting with the deployment of safety features, such as airbags. These interior cameras may also be utilized by service providers, in particular with autonomous vehicles, to create new business opportunities in which in-cabin information, collected through cameras, may be monetized. Our solutions process our customers' interior-sensing algorithms at high speeds and with low power consumption, and are effective even at night via onboard RGB-infrared processing. Our DMS solutions can be integrated with supplementary camera applications, including electronic mirror, front ADAS, and high-resolution driver recording.
 - **Central domain controllers for L2+ to L4 Autonomous Vehicles.** We continue to advance our research in critical areas of autonomous vehicle development, such as vehicle detection, obstacle detection, pedestrian detection, lane detection, traffic sign recognition, stereovision processing, and sensor fusion and planning, enabling us to design strong platforms for applications ranging from Level2+ autopilot to full autonomy. The CV3 family enables centralized, single-chip processing for multi-sensor perception, including high-resolution vision, radar, ultrasonic and lidar, as well as deep fusion for multiple sensor modalities and autonomous vehicle path planning. The central domain controller in autonomous vehicles is connected to the camera, radar and other sensor suites. Using neural network and traditional computer vision processing, the domain controller fuses the sensor data and perceives the vehicle's surroundings. Based on this multi-sensor surround perception, the domain controller estimates a safe driving path for the vehicle. In addition, the domain controller can simultaneously process in-cabin sensing applications, including driver and occupant monitoring.
 - **Security Cameras.** We are a leader in enterprise and home security camera markets, with solutions that deliver exceptional computer vision performance, industry-leading compression efficiency, low power consumption, and outstanding image quality, including high dynamic range (HDR), low-light processing and fisheye lens dewarping. Our CV products enable higher levels of automation than our vision processors through advanced algorithms, such as object detection, classification and tracking, license plate recognition and facial recognition. We address the following security camera applications:
 - **Enterprise and Public Class Security.** These cameras are used for video monitoring and security surveillance in enterprise and public infrastructure applications. Our solutions enable the streaming of multiple video streams to enable remote monitoring at multiple locations. Embedded computer vision technology supports advanced analytics at the system's edge, including people counting and tracking, facial recognition and retail behavior analysis.
 - **Home Security.** Home security cameras are designed for home or small business use and may be connected to cloud services and applications via home networks using WiFi. These cameras may require very low bitrate operation to support high-definition (HD) resolution over limited bandwidth connections, while their small form factors or battery powered design may require very low power operation. Form factors include smart video door-bells and video-enabled lights. Embedded computer vision technology supports advanced functions, including intruder and pet detection, face recognition and package monitoring.
 - **Emerging Robotic and Industrial Applications.** Our solutions can add intelligence to a range of partially or fully robotic applications, including access control, industrial/factory automation, sensing cameras, and a variety of industrial and home robotic applications. Our advanced CV SoCs handle an array of complex algorithms, from low-level perception functions and neural networks to higher-level autonomous software stacks, while our video processing pipeline enables operation in challenging lighting conditions such as high-contrast scenes and extremely low-light environments, all with low power consumption. We address the following industrial and robotic market applications:
 - **Identification/Authentication Cameras.** Our video-based sensing solutions enable contactless access control for home, enterprise and public applications. Our CV SoCs are engineered to quickly extract input from the physical environment, fuse data from multiple sensors, analyze the incoming data and deliver the appropriate feedback, with low-latency and low-power responsiveness. Applications include enterprise access control panels, electronic locks and contactless mobile payment terminals.
 - **Robotic Products.** Our products and technology are well suited for a variety of smart home and enterprise robotic applications. With stereovision capabilities and convolutional neural network (CNN)-based object classification, our solutions are also suited for a variety of industrial machine vision systems, mobile robots for delivery or factory/warehouse applications, aerial drones, robotic vacuum cleaners, and other emerging robotic applications.
 - **Sensing Cameras.** Our CV SoCs enable sensing cameras that analyze video using AI-based algorithms running in the camera to provide remote users with updates, warnings or business data based on the analysis. Since no video, audio or image data needs to leave the camera, privacy can be prioritized. Applications for sensing cameras include elderly monitoring, building occupancy monitoring and retail store business analytics.

- **Other IoT Applications.** Cameras for the home, public spaces and consumer leisure applications that provide HD video quality increasingly include embedded connectivity to share and display video. Our low power, high-resolution and connected solutions can be found in a variety of cameras, including wearable body cameras, sports action cameras, social media cameras, drones for capturing aerial video or photographs, video conferencing and virtual reality applications.

Our Competitive Strengths

Our platform technology solutions provide performance attributes that satisfy the stringent demands of the camera market, enable integration of HD video and image capture capabilities in portable devices, and provide computer vision capabilities that address the evolving needs of the automotive and IoT markets. We believe that our leadership is the result of our competitive strengths, including:

- **Proprietary AI, Radar and Computer Vision Architecture.** Our proprietary AI and computer vision processing architecture, known as CVflow, uses a flexible hardware engine programmed with a high level algorithm description to achieve increased performance while minimizing die size and power consumption. The CVflow architecture specifies data flow connections between a set of optimized AI and computer vision operators, such as the convolution and matrix multiply functions that are specifically optimized for deep learning algorithms. The CVflow architecture supports a variety of AI, radar and computer vision algorithms, including object detection, classification and tracking, semantic and instance segmentation, image processing, and stereo object detection. CVflow also allows customers to differentiate their products by porting their own algorithms and neural networks to our SoCs.
- **Deep Sensor Fusion.** Ambarella provides AI perception processing for cameras, and with the acquisition of Oculii we provide software that enables efficient HD 4D radar perception. Our CV3 SoC family implements centralized camera and radar perception processing on the same SoC, allowing data from all camera and radar sensors in the sensor suite to be fused at a deeper data level, which we believe will facilitate improved levels of perception accuracy.
- **High-Performance, Low Power, AI, Video and Image Algorithm Expertise.** Our extensive algorithm expertise, which facilitates efficient AI, video and image compression, enables our solutions to achieve low power consumption without compromising performance. Our solutions provide Full HD and UHD video up to 32-megapixel resolution and 60 frames per second. Our solutions achieve high storage and transmission efficiencies through innovative and complex video and image compression algorithms that significantly reduce the output bitrate. This smaller storage footprint directly benefits the performance of our solutions in several ways, including lower memory storage requirements and reduced bandwidth needs for transmission, which both facilitate sharing content between devices. These benefits are particularly important in transcoding, the digital-to-digital conversion of one encoding format to another, and video cloud applications. Our solutions can deliver clear images in low light conditions because of our advanced noise reduction, including 3D motion compensated temporal filtering (MCTF) and multiple exposure processing. Additionally, our HDR processing capabilities handle scenes with large dynamic range between the lightest and darkest areas to reveal details that would otherwise be lost in shadow or highlight areas. Our advanced de-warping capability enables cameras to use wide angle lenses, making it ideal for a variety of security camera applications, as well as 3D electronic image stabilization and surround view for automotive applications.
- **Highly Integrated SoC Solutions Based on a Scalable Platform.** Our product families leverage a flexible and highly-scalable platform including our core high-performance AI and video processing architecture combined with an extensive set of integrated peripherals. Our flexible and highly-scalable platform enables our customers to address multiple applications and markets with reduced design cycles and costs. Our software compatible portfolio of products, with a broad range of performance and price points, allows our customers to develop a range of end products from a common software base.
- **Comprehensive and Flexible Software.** Our years of investment in developing and optimizing our comprehensive and flexible software serve as the foundation of our high-performance video application solutions. Key components of our software include highly customized middleware that integrates many unique features for efficient scheduling and other system-level functions, and firmware that is optimized to reduce power requirements and improve performance. In addition, we provide our customers full-function software development kits with a suite of application programming interfaces or APIs, which allow customers to rapidly integrate our solution, adjust product specifications and provide additional functionality to their systems, thereby enabling them to differentiate their product offerings and reduce time to market. We also provide extensive software tools to map algorithms from commonly-used AI frameworks such as PyTorch or TensorFlow into our proprietary CVflow architecture. Our software development kits (SDKs) contain reference code for specific features that customers can quickly deploy.

Products

We have a wide range of products in our portfolio, including products that have commercially shipped, products for which we have shipped engineering samples and products that are under development. We typically introduce two to three new silicon products per year which, when combined with our flexible software development kits, allow us to offer product families addressing the specific needs of a wide range of end markets. In addition to enabling small device size and low power consumption, our SoC solutions make possible differentiated functionalities, such as computer vision functionality, simultaneous video and image capture, multiple-stream video capture, image stabilization and wireless connectivity.

Central Domain Controller. Our new CV3-AD685, the first production version of the CV3 family of automotive AI domain controllers, targets L2+ to L4 autonomous vehicles. Its next-generation CVflow® AI engine includes neural network processing that is 20x faster than the previous generation of CV2 SoCs, along with additional general vector processing capabilities to provide the overall performance required for full autonomous driving (AD) stack processing, including computer vision, HD radar, deep fusion and planning. It also integrates advanced image processing, a dense stereo and optical flow engine, Arm® Cortex® A78AE and R52 CPUs, an automotive GPU for visualizations, and a hardware security module (HSM). The CV3-AD685 is an “algorithm first” architecture that provides support for the entire AD software stack.

CVflow SoCs. Our AI architecture, incorporated into our CV family of SoCs, extracts and processes data from video streams, enabling our customers to develop intelligent camera systems. These SoCs combine advanced image processing, high-resolution video encoding and CVflow AI processing in a single, low-power design to enable a new class of smart edge devices for applications including smart home security, retail monitoring, consumer robotics, and occupancy monitoring. Some of our CVflow SoCs are manufactured to satisfy the functional safety requirements of the automotive market.

Vision Processor SoCs. Our video and image processing SoCs, based on our proprietary architecture, integrate an advanced image sensor pipeline (ISP), H.264 and/or H.265 encoders, and a powerful ARM CPU for advanced analytics, flight control, WiFi streaming, and other user applications. Our unique architecture and advanced process node technology lower power consumption while maintaining high performance for security camera and consumer applications such as connected drones, sports cameras, and 360° (VR) cameras.

High Definition Radar. Through our acquisition of Oculii, we offer adaptive AI software algorithms designed to enable radar perception using current production radar chips to achieve significantly higher resolution, longer range and greater accuracy. These improvements eliminate the need for specialized high-resolution radar chips, which have significantly higher power consumption and cost than conventional radar solutions. Oculii’s software can be deployed on Ambarella’s existing CVflow SoCs, operating in conjunction with leading radar RF solutions to increase safety and reliability. In addition, we recently introduced a centralized radar architecture that leverages Oculii’s adaptive AI software algorithms together with our CV3 processor family to enable both central processing of raw radar data and deep, low-level fusion with other sensor inputs, including cameras, lidar and ultrasonics.


Serializer/Deserializers. Our B6 and B8 SerDes (Serializer/Deserializer) products are mixed-signal (analog and digital) semiconductors used to transport data short distances (up to 10 meters) from a CMOS image sensor, often in a remote camera location, to our video and CV SoCs. The SerDes chips are used to add additional camera(s) to an automotive application, as well as used as a bridge chip for other automotive applications, such as a MIPI combiner, splitter or display driver. Our SerDes chips are also used in security applications such as ATMs that can use a single B8 chip for connecting multiple remote cameras to a single video processor SoC.

Software Modules. In the future, we may separately license proprietary software modules that can be used in conjunction with a customer’s internally developed software and/or with third-party software. Features that may be licensed include functionality for a variety of automotive applications, including dataloggers, ADAS and autonomous driving systems, eMirrors and in-cabin applications. Additionally, our neural-network image signal processing (NN-ISP) software module improves low light imaging in security camera applications.

The chart below describes our current product lines:

Product Portfolio

Automotive Central Domain Controller CVflow




**Ambarella
CV3-AD**

- CVflow® - 3rd generation
- Over 40x AI performance compared to previous generation CV2 SoC
- General vector processor for classical computer vision and radar processing
- Up to 16 Arm® Cortex® -A7BAE CPUs
- Up to 3 pairs of Arm Cortex-R52 lockstep CPUs for the safety island
- Advanced image and radar signal processing


- Stereo and Optical Flow
- Automotive GPU
- Hardware Security Module
- ASIL B(D)
- 5 nm

CVflow AI Processor Families CVflow




**Ambarella
CV28**

- CVflow - 0.25X perf.
- 4K H.265, H.264
- Dual Core Arm® A53
- 3 Camera Inputs
- 10 nm




**Ambarella
CV25**

- CVflow - 0.5X perf.
- 4K H.265, H.264
- Quad Arm® A53
- 3 Camera Inputs
- 10 nm




**Ambarella
CV22**

- CVflow - 1X perf.
- 4KP60 H.265, H.264
- Quad Arm® A53
- 2 Camera Inputs
- 10 nm




**Ambarella
CV2**

- CVflow - 4X perf.
- 4KP60 H.265, H.264
- Quad Arm® A53
- 6 Camera Inputs
- Stereovision
- 10 nm



**Ambarella
CV5**


- CVflow - 3.5X perf.
- 8KP60 H.264, H.265
- Dual Core Arm® A76
- 14 Camera Inputs
- 5 nm



**Ambarella
CV72**


- CVflow - 3rd generation - 6X perf.
- 4KP60 H.264, H.265
- Advanced image and radar signal processing
- Dual Core Arm® A76 + Cortex® M3
- 3 Camera Inputs
- 5 nm

Automotive CVflow Processor Families CVflow



**Ambarella
CV2FS**


- CVflow - 1.8X perf.
- 4KP30 H.264
- Quad Arm® A53
- 3 Camera Inputs



**Ambarella
CV22FS**


- CVflow - 1X perf.
- 4KP30 H.264
- Quad Arm® A53
- 3 Camera Inputs
- ASIL C

Vision Processor Families




**Ambarella
S2L / A12**

- 5MP H.264
- Arm® A9
- 2 Camera Inputs
- 28 nm




**Ambarella
S3L / H12**

- 8MP H.265, H.264
- Arm® A9
- HDR
- 28 nm




**Ambarella
S5L / H22**

- 4KP30+ H.265, H.264
- Quad Arm® A53
- 2 Camera Inputs
- 14 nm




**Ambarella
S5 / H2**

- 4KP60 H.265, 4KP90 H.264
- Quad Arm® A53
- 2 Camera Inputs
- 10-bit processing
- 28 nm



**Ambarella
S6L / H32**

- 5MP+ H.265, H.264
- Quad Arm® A53
- 3 Camera Inputs
- 10 nm



**Ambarella
B8**

Automotive transceiver / receivers
Note 1: additional cameras can be supported using external SERDES

Note 2: video processing trade-offs available between frame-per-second, resolution, and the number of cameras supported

*S part numbers are Linux OS for security market.
 *H part numbers are real time OS for consumer applications.

Technology

Our semiconductor processing solutions enable artificial intelligence and computer vision processing, HD, UHD and 8K UHD (up to 7680 x 4320p60) video and image processing, and video compression, sharing and display while offering exceptional power, size, and performance characteristics.

Key differentiators of our technology include:

- flexible and scalable CVflow processors for deep learning, HD radar processing and other CV algorithms that cover a broad range of consumer, professional and automotive requirements with power and die size efficiency;
- stereo/optical flow processing engines for robust CV processing with high performance and power efficiency;
- scalable image processing and video compression engines that cover consumer, professional and automotive requirements from Full HD to 8K video performance levels as well as multiple image sensors simultaneously to support multiple viewpoints, including surround view and virtual reality applications;
- algorithms for image processing including deep learning augmented processing for challenging low light and high dynamic range conditions for robust CV and human viewing with high power efficiency.
- algorithms and software for scalable and robust HD 4D radar processing using sparse antenna arrays using machine learning and adaptive transmit waveforms for lower cost and better power efficiency;
- deep learning algorithms and software for multi class 2D/3D object detection and segmentation, including vehicles, pedestrians, cycles, road markings, traffic signs and traffic lights optimized for our CV2 and CV3 SoC families;
- algorithms and software for stereo obstacle detection to provide robust safety in the event of obstacles that are not in the training data;
- autonomous driving stack modules optimized for our CV3 SoC family, including fusion for multiple cameras and sensor modalities, mapping and localization algorithms and planning;
- algorithms to compress video signals with high compression and power efficiency at multiple operating points;
- software development kit comprised of application programming interfaces, or APIs, to facilitate integration into customers' products; and tools for porting and optimizing customer deep neural networks, or DNNs, developed in industry standard training frameworks;
- low-power architecture with minimal system memory footprint; and
- programmable architecture that balances flexibility, quality, power and die size with powerful CPUs and optimized hardware acceleration to support advanced processing functions.

Our technology platform is based on a high-performance, low-power architecture supported by a high level of system integration. The building blocks of our platform are illustrated below:

Complete SoC,
System Software, AI
Development Tools,
Reference Designs

System Integration Expertise

Enable safety-critical
auto applications

Functional Safety Design Methodology

Enabling HD Video
plus AI in small form
factor cameras

Low Power Design Methodology

Multi-core,
multi-threaded
architecture

High Performance Chip Architecture



Advanced Image
Processing, AI-
Based Image
Processing



Smart
H.264/H.265
Video
Compression



Oculii
Patented Adaptive
AI Radar
Algorithms



Deep Neural
Network AI
Processor

300 + International Patents Filed

Our technology platform enables the capture of high-resolution still images and UHD video while simultaneously performing CV processing and encoding for high-quality storage and lower resolution real time streaming.

CVflow

Our proprietary AI computer vision processing architecture, known as CVflow®, uses a flexible hardware engine programmed with a data flow graph algorithm description to achieve increased performance while minimizing die size and power consumption. This description allows the hardware to maximize use of its resources by exploiting all available parallelism without software intervention. The CVflow architecture specifies data flow connections between a set of optimized AI and computer vision operators, such as the convolution and matrix multiply functions that are used for deep learning algorithms. The CVflow architecture also supports a variety of other algorithms, including radar processing, stereo obstacle detection and sensor fusion. Our platform allows customers to differentiate their products by porting and optimizing their own algorithms and neural networks to our CVflow-based chips using industry-standard training tools and APIs.

Computer Vision and Radar Technology

Computer vision is a core technology that complements our proprietary image processing and video compression technology. We have developed efficient deep learning algorithms for object detection and segmentation leveraging our deep understanding of the CVflow processor. A significant feature of our third generation CVflow SoCs is support for HD stereo and HD radar based depth and velocity sensing. We believe HD stereo and HD radar are complementary sensor modalities that provide robust depth information after fusion. This depth information provides an important augmentation to monocular computer vision processing, resulting in an extra margin of safety for autonomous driving and other applications. Monocular processing depends on training to detect obstacles, and may not detect obstacles that are not represented in the training set. Stereo cameras and radar detect obstacles without relying on training for specific obstacle categories because the depth information is used to directly construct a three-dimensional model of the camera's surroundings, including any obstacles. This allows more robust decisions to be made in applications such as autonomous driving.

Compatible Family of SoC Solutions

Our current SoC designs integrate our fully-programmable and highly-efficient CVflow architecture, UHD image processing and video compression, applications processing and system functions onto a single chip, delivering exceptional performance, quality and power efficiency with differentiated features. Our multi-core DSP architecture is highly scalable and balances software programmability with hardware-accelerated performance to achieve extremely low power consumption and maximized camera battery life. We have used this scalability to develop an extensive family of software compatible SoCs with a wide range of performance and price points (CV28, CV25, CV22, CV2, CV2FS, CV5, CV3 AD685, and CV-3 High Dev). This scalable, programmable architecture provides our customers with the flexibility they need to quickly develop a wide range of differentiated products. Additionally, our SoCs integrate mixed signal (analog/digital) functionality and high speed interfaces required for interfacing to advanced high-speed CMOS sensors and industry standard interfaces such as PCI-E, USB 3.2 and HDMI 2.0. Our next generation CV3 family extends our CVflow architecture to cover L2+/L3/L4 autonomous driving and other high performance safety critical applications. The CV3 family will cover multiple performance and price points with a software compatible SDK.

Software Development Kits

We provide to our customers fully-functional software development kits with a suite of APIs which allow customers to rapidly integrate our solution, adjust product specifications and provide additional functionality to their systems, thereby enabling them to differentiate their product offerings and reduce time to market. We have software development kits for all of our core markets.

We also provide a toolkit to accelerate the development of computer vision algorithms onto our hardware. We provide tools to map and optimize algorithms developed in commonly used computer vision frameworks such as PyTorch or TensorFlow into our proprietary CVflow architecture. We also provide a framework for development of higher-level computer vision tasks. This enables our customers to write complex computer vision algorithms with multiple tasks running in parallel on multiple processing engines, as would be required in applications such as autonomous driving.

Software Modules

We are developing optimized software modules to give customers the option to leverage our expertise and reduce development time and expense. These modules include HD radar processing for standalone and central radar processing, DL based low light and HDR image processing, monocular and stereo camera perception, and autonomous driving stack modules optimized for the CV3 family, including fusion for multiple cameras and sensor modalities, mapping and localization algorithms and planning.

AmbaClear

Our proprietary image signal processing architecture, known as AmbaClear, incorporates advanced algorithms to convert raw sensor data to UHD video and/or still images. Image processing algorithms include sensor, lens and color correction, HDR tone mapping, color processing and de-mosaicing to reconstruct a full color image from incomplete color samples and specialized color filters, noise filtering, detail enhancement and image format conversion. For example, raw sensor data can be captured at up to 32-megapixel (8K) resolution at 60 frames per second. This image processing reduces noise in the sensor data and improves color, contrast and sharpness resulting in improved computer vision performance, enhanced human viewing and enhanced storage and transmission efficiencies. Our WDR and HDR processing capabilities handle greater dynamic range between the lightest and darkest areas of an image, permitting video images to reveal details that would otherwise be lost against a bright background. We have developed efficient scalable deep learning algorithms for advanced low light processing and HDR tone mapping that augment our image processing hardware. These algorithms provide significant image quality improvements over our standard image processing while running in real time at HD and higher resolutions. Our advanced de-warping capability enables cameras to use wide angle lenses to capture images from a wide area, making it ideal for a variety of IP security camera and surround view applications. Our RGB-infrared fusion capability allows a single sensor to produce simultaneous RGB and infrared images for sensing and improved low light performance.

AmbaCast

Our proprietary UHD video compression architecture, known as AmbaCast, incorporates advanced algorithms for motion estimation, motion-compensated 3D temporal filtering, mode decision and AI based rate control. Successful implementation of these computationally intensive steps has helped us maximize compression efficiency. We support H.264 and H.265 video compression standard with our H.265 providing up to 2x better compression efficiency compared to our H.264 video compression technology.

Design Methodology

The success of our technology platform stems from our algorithm driven design methodology. We do extensive algorithm studies in deep learning AI, image processing and compression including our internally developed and public external algorithms. We use these studies to develop high power and die area efficient processing engines compared with general purpose processors like CPUs and GPUs. We also include a high degree of programmability to provide flexibility in supporting new algorithms that we and our customers develop. We test and verify our algorithms on our proprietary architectural model prior to implementing our processor engines in hardware. Our advanced verification methodology validates our approach through simultaneous modeling of architecture, algorithms, and the hardware itself. This redundant approach enables us to identify and remediate any weaknesses early in the development cycle, providing a solid foundation on which we build our hardware implementation, and enhances our ability to achieve first-pass silicon success. We possess extensive expertise in AI deep learning, video and imaging algorithms, as well as deep sub-micron digital and mixed-signal design experience.

Customers

We sell our solutions to leading original design manufacturers, or ODMs, and original equipment manufacturers, or OEMs, globally. In the automotive OEM market, we may sell our solutions to Tier-1 suppliers that develop and sell devices incorporating our solutions to automotive OEMs. We refer to ODMs and Tier-1 suppliers as our customers and OEMs as our end customers, except as otherwise indicated or as the context otherwise requires.

Sales to customers in Asia accounted for approximately 82%, 88%, and 88% of our total revenue in the fiscal years ended January 31, 2023, 2022, and 2021, respectively. As many of our OEM end customers or their ODM manufacturers are located in Asia, we anticipate that a majority of our revenue will continue to come from sales to customers in that region. Although a large percentage of our sales are made to customers in Asia, we believe that a significant number of the products designed by these customers and incorporating our SoCs are then sold to consumers globally. To date, all of our sales have been denominated in U.S. dollars.

We work closely with our end customer OEMs and ODMs throughout their product design cycles that often last nine to eighteen months for many of our target markets, although new products may have longer design cycles, particularly those implementing advanced AI features. Product design cycles for certain portions of the automotive market generally last longer than eighteen months, particularly for products containing user safety features. As a result, we are able to develop long-term relationships with our customers as our technology becomes embedded in their products. Consequently, we believe we are well positioned to not only be designed into our customers' current products, but also to continue to develop next-generation HD video and image processing solutions for their future products.

The product life cycles in many of our target markets typically range from twelve to 24 months. We expect that product lifecycles in the automotive OEM and the industrial and robotics markets will typically be longer than 24 months, as new product introductions occur less frequently. For many of our solutions, early engagement with our customers' technical staff is necessary for success.

In fiscal year 2023, the customers representing 10% or more of revenue were Wintech Microelectronics Co., Ltd., or WT, our Asia-based distributor, and Chicony Electronics Co., Ltd., or Chicony, a direct ODM customer that manufactures products for multiple end-customers, which accounted for approximately 57% and 12% of total revenue, respectively. We currently rely, and expect to continue to rely, on a limited number of customers for a significant portion of our revenue.

Sales and Marketing

We sell our solutions worldwide using our direct sales force and our distributors. We have direct sales personnel covering the United States, Asia and Europe, and we operate sales offices in Santa Clara, California and Hong Kong, and business development offices in China, Germany, Japan, South Korea, and Taiwan. In addition, in each of these locations we employ a staff of field applications engineers to provide direct engineering support locally to our customers.

Our sales cycles typically require a significant investment of time and a substantial expenditure of resources before we can realize revenue from the sale of our solutions, if any. Our typical sales cycle consists of a multi-month sales and development process involving our customers' system designers and management and our sales personnel and software engineers. If successful, this process culminates in a customer's decision to use our solutions in its system, which we refer to as a design win. Our sales efforts are typically directed to the OEM of the product that will incorporate our computer vision and video and image processing solution, but the eventual design and incorporation of our SoC into the product may be handled by an ODM or Tier-1 supplier on behalf of the OEM. Volume production may begin within nine to 18 months after a design win, depending on the complexity of our customer's product and other factors upon which we may have little or no influence. Once our solutions have been incorporated into a customer's design, they are likely to be used for the life cycle of the customer's product. Conversely, a design loss to a competitor will likely preclude any opportunity for future revenue from such customer's product.

Our sales are generally made pursuant to purchase orders received approximately four to 30 weeks prior to the scheduled product delivery date, depending upon agreed terms with our customers and the current manufacturing lead time at the time the purchase order is received. These purchase orders may be cancelled without charge upon notification within an agreed period of time in advance of the delivery date. Our standard warranty provides that our SoCs containing defects in materials, workmanship or performance may be returned for a refund of the purchase price or for replacement, at our discretion. We may agree to different warranty terms with specific customers from time to time.

Our sales are primarily made through standard purchase orders for delivery of products. Our manufacturing production is based on estimates and advance non-binding commitments from customers as to future purchases. We follow industry practice that allows customers to cancel, change or defer orders with limited advance notice prior to shipment. Given this practice, we do not believe that backlog is a reliable indicator of future revenue levels.

Manufacturing

We employ a fables business model and use third-party foundries and assembly and test contractors to manufacture, assemble and test our solutions. This outsourced manufacturing approach allows us to focus our resources on the design, sales and marketing of our solutions and avoid the cost associated with owning and operating our own manufacturing facility. Our engineers work closely with foundries and other contractors to increase yields, lower manufacturing costs and improve quality. In addition, we believe outsourcing many of our manufacturing and assembly activities provides us the flexibility needed to respond to new market opportunities, simplifies our operations and significantly reduces our capital requirements. We do not have a guaranteed level of production capacity from any of our suppliers' facilities to produce our solutions. We carefully qualify each of our suppliers and their subcontractors and processes in order to meet the extremely high-quality and reliability standards required of our solutions.

Wafer Fabrication

We have a history of using several process nodes from 130 nm through 5 nm. We aim to use the most advanced manufacturing process technology appropriate for our products that is available from our third-party foundries. As a result, we periodically evaluate the benefits of migrating our solutions to smaller geometry process technologies in order to improve performance and efficiency. We believe this strategy will help us remain competitive. While we currently manufacture the majority of our solutions in the 28 nm, 14 nm and 10 nm process nodes, our most recent products are manufactured in the 5 nm process node. Currently, the substantial majority of our SoCs are supplied by Samsung in facilities located in Austin, Texas and South Korea, from whom we have the option to purchase both fully-assembled and tested products as well as tested die in wafer form for assembly. We also have small volumes of some products supplied by GlobalFoundries Inc. Our foundry vendors are ISO 9001 certified.

Assembly and Testing

Samsung subcontracts the assembly and initial testing of the assembled chips it supplies to us to Signetics Corporation and STATS ChipPAC Ltd. In the case of purchases of tested die from Samsung, we contract the assembly to Advanced Semiconductor Engineering, Inc., or ASE. We contract the assembly of products supplied by Global Foundries Inc. to ASE. Final testing of our products is handled primarily by Sigurd Corporation or King Yuan Electronics Co., Ltd. under the supervision of our engineers. All test software and related processes for our products are developed by our engineers. We continually monitor the results of testing at all of our test contractors to ensure that our testing procedures are properly implemented.

As part of our total quality assurance program, our quality management system has been certified to ISO 9001:2015 standards. Our assembly and testing vendors are also ISO 9001 certified.

Due to the scheduling requirements of our foundry, assembly and test contractors, we generally provide our contractors with our production forecasts and place firm orders for products with our suppliers up to 36 weeks prior to the anticipated delivery date, or potentially longer during times of acute capacity shortages, usually without a purchase order from our own customers.

Research and Development

We believe our technology is a competitive advantage and we engage in substantial research and development efforts to develop new products and integrate AI computer vision capabilities into our HD and UHD video processing solutions. We believe that our continued success depends on our ability to both introduce improved versions of our existing solutions and to develop new solutions for the markets that we serve. As of January 31, 2023, approximately 74% of our employees are engaged in research and development. Our research and development team is comprised of both semiconductor and software designers. Our semiconductor design team has extensive experience in large-scale semiconductor design, including architecture description, logic and circuit design, implementation and verification. Our software design team has extensive experience in development and verification of software for the HD video market. Because the integration of hardware and software is a key competitive advantage of our solutions, our hardware and software design teams work closely together throughout the product development process. The experience of our hardware and software design teams enables us to effectively assess tradeoffs and advantages when determining which features and capabilities of our solutions should be implemented in hardware and in software.

We have assembled a core team of experienced engineers and systems designers in four research and development design centers located in the United States, China, Italy, and Taiwan.

Competition

The global semiconductor market in general, and the AI and video and image processing markets in particular, are highly competitive. We expect competition to increase and intensify as more and larger semiconductor companies enter our markets and as we penetrate new markets, such as the automotive OEM market. Increased competition could result in price pressure, reduced profitability and loss of market share, any of which could materially and adversely affect our business, revenue and operating results.

Our competitors range from large, international companies offering a wide range of semiconductor products to smaller companies specializing in narrow markets. In the IoT market, our primary competitors include AMLogic Inc., Fuzhou Rockchip Electronics Co., Ltd., HiSilicon Technologies Co., Ltd., or HiSilicon, which is owned by Huawei Technologies Co., Ingenic Semiconductor Co., Ltd., Novatek Microelectronics Corp., or Novatek, NVIDIA Corporation, or NVIDIA, OmniVision Technologies, Inc., Qualcomm Incorporated, or Qualcomm, Sigmastar Technology Ltd., and Socionext Inc. In the automotive camera market, we compete against Allwinner Technology Co., Ltd., Horizon Robotics Inc., iCatch Technology, Inc., Mobileye, a subsidiary of Intel Corporation, Novatek, NVIDIA, NXP Semiconductors N.V., Qualcomm, Renesas Electronics Corporation, and Texas Instruments. Certain of our customers and suppliers also have divisions that produce products that compete with ours.

Our ability to compete successfully depends on elements both within and outside of our control, including industry and general economic trends. Many of our competitors are substantially larger, have greater financial, technical, marketing, distribution, customer support and other resources, are more established than we are, and have significantly better brand recognition and broader product offerings which may enable them to develop and enable new technology into product solutions better or faster than us and to better withstand adverse economic or market conditions in the future.

Our ability to compete successfully in the rapidly evolving camera markets depends on several factors, including:

- the design and manufacturing of new solutions, including software, that anticipate the video processing and integration needs of our customers' next-generation products and applications;
- performance of our computer vision solutions, as measured by convolutional neural network performance, video and still picture image quality, resolution and frame processing rates;
- power consumption efficiency of our solutions;
- the ease of implementation of our products by customers;
- the strength of our customer relationships;
- the selection of the foundry process technology and architecture tradeoffs to meet customers' product requirements in a timely manner;

- reputation and reliability;
- customer support; and
- the cost of the total solution.

We believe we compete favorably with respect to these factors, particularly because our solutions typically provide high-performance and low power consumption video, CNN performance, efficient integration of our advanced algorithms, exceptional storage and transmission efficiencies at lower power, highly-integrated SoC solutions based on a scalable platform, and comprehensive and flexible software. We cannot ensure, however, that our solutions will continue to compete favorably or that we will be successful in the face of increasing competition from new products introduced by existing or new competitors.

Intellectual Property

We rely on a combination of intellectual property rights, including patents, trade secrets, copyrights and trademarks, and contractual protections, to protect our core technology and intellectual property. As of January 31, 2023, we had 300 issued patents in the United States, 109 of which were continuation or divisional patents, 10 issued patents in Europe, 7 issued patents in China, 7 issued patents in Japan and 86 pending patent applications in the United States. The issued patents in the United States expire beginning in 2024 through 2042. Our issued patents and pending patent applications primarily relate to image and video processing and HD video compression, AI processing, system level camera, and radar perception applications spanning multiple market segments.

We may not receive competitive advantages from any rights granted under our patents, and our patent applications may not result in the issuance of any new patents. In addition, any patent we hold may be opposed, contested, circumvented, designed around by a third party or found to be unenforceable or invalidated. Others may develop technologies that are similar or superior to our proprietary technologies, duplicate our proprietary technologies or design around patents owned or licensed by us.

In addition to our own intellectual property, we also use third-party licenses for certain technologies embedded in our SoC solutions. These are typically non-exclusive contracts provided under royalty-accruing or paid-up licenses. These licenses are generally perpetual or automatically renewed for so long as we continue to pay any maintenance fees that may be due. To date, maintenance fees have not constituted a significant portion of our capital expenditures. While we do not believe our business is dependent to any significant degree on any individual third-party license, we expect to continue to use and may license additional third-party technology for our solutions.

We generally control access to and use of our confidential information through employing internal and external controls, including contractual protections with employees, contractors and customers. We rely in part on U.S. and international copyright laws to protect our mask work. All employees and consultants are required to execute confidentiality agreements in connection with their employment and consulting relationships with us. We also require them to agree to disclose and assign to us all inventions conceived or made in connection with the employment or consulting relationship.

Despite our efforts to protect our intellectual property, unauthorized parties may still copy or otherwise obtain and use our software, technology or other information that we regard as proprietary intellectual property. In addition, we continue to operate internationally, and effective patent, copyright, trademark and trade secret protection may not be available or may be limited in foreign countries.

Seasonality

Our business has tended to be seasonal with higher revenue in our second and third fiscal quarters as our customers typically increase their production to meet holiday shopping season or year-end demand for their products. We also may experience seasonally lower demand in our first and fourth fiscal quarters due in part to the Asia-based portion of the security camera market as a result of industry seasonality and the impact of ODM and OEM factory closures associated with the Chinese New Year holiday. These seasonal fluctuations may diminish if our revenue diversifies and becomes less dependent on sales of our customers' consumer products.

Governmental Regulation

Our business and operations around the world are subject to government regulation at the national, state or local level addressing, among other matters, applicable environmental laws, health and safety laws and regulations, laws relating to export controls and economic sanctions, and the rules of industrial standards bodies such as the International Standards Organization and governmental agencies such as the Federal Trade Commission.

We believe that our properties and operations comply in all material respects with applicable laws protecting the environment and worker health and safety. As a fabless semiconductor company, we do not manufacture our own products but do maintain laboratory space at certain of our facilities to facilitate the development, evaluation and testing of our SoC products. These laboratories may maintain small quantities of hazardous materials. While we believe we are in material compliance with applicable law concerning the safeguarding of these materials and with respect to other matters relating to health, safety and the environment, the risk of liability relating to hazardous conditions or materials cannot be eliminated completely. To date, we have not incurred significant expenditures relating to environmental compliance at our facilities nor have we experienced any material issues relating to employee health and safety.

In addition to environmental and worker health and safety laws, our business is subject to various rules and regulations and executive orders relating to export controls and trade sanctions. Certain of our products are subject to the Export Administration Regulations (EAR), which are administered by the United States Department of Commerce's Bureau of Industry and Security (BIS), and we may from time to time be required to obtain an export license before we can export certain products or technology to specified countries or customers. In addition, the EAR imposes broad controls on entities listed on sanctioned persons lists, including the BIS Entity List. If one of our customers is listed on the BIS Entity List or another U.S. government sanctioned persons' list, then subject to certain exceptions, we will, as a general rule, be precluded from doing business with that customer. For example, certain of our Chinese customers, or their affiliated entities, have been added to the BIS Entity List in the last couple of years, which limits our ability to ship certain products to these customers. We cannot guarantee that export control restrictions or sanctions imposed in the future will not prevent, or materially limit, our ability to conduct business with certain customers or in certain countries. Any failure to comply with these laws could result in governmental enforcement actions, including substantial monetary penalties and denial of export privileges.

Human Capital Resources

Innovation has been the lifeblood of our company since our founding in 2004. We continually strive to develop leading-edge image and video, and now AI, processors using the most advanced semiconductor processes available to create high performance, power efficient SoCs. We depend on our people to sustain our competitive advantages.

As of January 31, 2023, we employed a total of 937 people, including 260 in the United States, 595 in Asia, primarily 355 in Taiwan and 223 in China, and 82 in Europe. Approximately 74% of our employees are engaged in research and development, 2% in operations, and 24% in sales, marketing and administration. As of January 31, 2023, females represented 29% of our independent directors, 21% of senior management, 16% of our technical roles, and 20% of our total workforce. Of our total employee workforce, 38% is represented by a work council in Taiwan. The work council group, which is common in Taiwan, is comprised of employees elected by the general employee base in that location. We consider our global employee relations to be good. Despite employees working in geographically disparate locations and differences in cultures, we strive to treat all employees as part of one team working together. Our Chief Executive Officer holds quarterly town hall style meetings with employees of all of our offices to keep employees apprised of company activities and objectives and to provide an opportunity for all employees to meet and ask questions. All employees receive training in the prevention of sexual harassment and abusive conduct in the workplace.

Our human capital resources objectives include attracting and retaining talented and experienced employees. We utilize multiple online search tools, specialized recruiting firms, employee referral programs and university hires to ensure a varied outreach approach for candidates. We are committed to ensuring the human rights of our worldwide workforce and treating all employees with dignity and respect. We offer a combination of competitive base salary, time-based equity incentives and bonus plans linked to financial and strategic performance that are designed to motivate and reward personnel with annual grants of stock-based and cash-based incentive compensation awards, plus other benefits, in order to increase stockholder value and the success of our company by motivating such individuals to perform to the best of their abilities and achieve both our short and long-term objectives. We offer competitive benefits tailored to local markets and laws and designed to support employee health, welfare and retirement; examples of such benefits include paid time off; 401(k), pension or other retirement plans; an employee stock purchase plan; basic and voluntary life, disability and supplemental insurance; medical, dental and vision insurance; health savings and flexible spending accounts; relocation assistance; and employee assistance programs. Approximately 81% of eligible U.S. employees participate in our 401(k) plan, and 89% of eligible employees participated in the most recent offering period of our employee stock purchase plan.

The average tenure of our employees is approximately 7.4 years and approximately 30% of our employees have been employed by us for more than 10 years. We believe our compensation and benefits packages, combined with our culture that promotes teamwork, innovation and hands-on experience from the first day of employment, contribute to low employee turnover and an above-average tenure. We monitor employee turnover rates by region and our company as a whole. Our worldwide voluntary employee turnover rate in fiscal year 2023 was approximately 7.4%.

Our primary focus during the COVID-19 pandemic has been protecting the health and safety of our employees and the communities in which we operate. In our locations that have experienced high rates of infection, employees have worked remotely to reduce spread of the virus.

Corporate Information

Ambarella was founded and incorporated in the Cayman Islands in January 2004. Our registered address is PO Box 309GT, Uglan House, South Church Street, George Town, Grand Cayman, Cayman Islands. The address of our U.S. operating subsidiary is Ambarella Corporation, 3101 Jay Street, Santa Clara, California. The Securities and Exchange Commission, or SEC, maintains a website at www.sec.gov that contains reports, proxy, and information statements, and other information regarding registrants that file electronically. You may also obtain copies of our Forms 10-K, 10-Q, 8-K, and other filings with the SEC, and all amendments to these filings, free of charge, by visiting the Investor Relations page on our website (<http://investor.ambarella.com>) as soon as reasonably practicable following our filing of any of these reports with the SEC. Information on our website is not incorporated into this Annual Report on Form 10-K or our other securities filings and is not a part of such filings.

ITEM 1A. Risk Factors

Certain factors may have a material adverse effect on our business, financial condition and results of operations. You should consider carefully the risks and uncertainties described below, in addition to other information contained in this Annual Report on Form 10-K, including our consolidated financial statements and related notes. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that adversely affect our business. If any of the following risks actually occurs, our business, financial condition, results of operations, and future prospects could be materially and adversely affected. In that event, the trading price of our ordinary shares could decline, and you could lose part or all of your investment.

Summary of Risk Factors

Our business and our industry is subject to numerous risks and uncertainties, including those described in the following Risk Factors. These risks include, but are not limited to, the following:

- Risks related to the global semiconductor supply shortage, high inflation and weak economic conditions could adversely affect our business, financial condition, and results of operations.
- If we fail to penetrate new markets, including the automotive original equipment manufacturer, or OEM, advanced driver assistance systems (ADAS) market, our revenue and financial condition could be harmed.
- If our customers do not design our solutions into their product offerings, or if our customers' product offerings are not commercially successful, our business would suffer.
- If we fail to develop and introduce new or enhanced solutions that meet market requirements on a timely basis, our ability to attract and retain customers could be impaired and our competitive position could be harmed.
- Shortages in, or increased costs of, wafers and materials could adversely impact our gross margins and lead to reduced revenues.
- Our primary inventory warehouse is located in Hong Kong and may be affected by political, social and economic conditions in Hong Kong.
- Our target markets may not grow or develop as we currently expect and are subject to market risks, any of which could harm our business, revenue and operating results.
- The COVID-19 pandemic has adversely affected our business and could materially and adversely affect our business in the future.
- Our customers may cancel their orders, change production quantities or delay production. If we fail to accurately forecast demand for our solutions, revenue shortfalls or excess, obsolete or insufficient inventory could result.
- We depend on a limited number of customers and end customers for a significant portion of our revenue. If we fail to retain or expand our customer relationships, our revenue could decline.

- Achieving design wins is subject to lengthy competitive selection processes that require us to incur significant costs. Even if we begin a product design, a customer may decide to cancel or change its product plans, resulting in no revenue from such expenditures.
- Some of our customers may require our products and our third-party contractors to undergo a qualification process that does not assure product sales. If we are unsuccessful or delayed in qualifying these products or third-party contractors with a customer, our business and operating results could suffer.
- We expect competition to increase in the future, which could have an adverse effect on our revenue and market share.
- A breach of our security systems may have a material adverse effect on our business.
- While we intend to continue to invest in research and development, we may be unable to make the substantial investments that are required to remain competitive in our business.
- We rely on highly skilled personnel and, if we are unable to hire, retain or motivate key personnel, we may not be able to grow effectively. Similarly, the loss of any of our key personnel could seriously harm our business.
- The average selling prices of semiconductor solutions in our target markets have typically decreased over time and will likely do so in the future, which could harm our revenue and gross margins.
- If we are unable to manage any future growth, we may not be able to execute our business plan and our operating results could suffer.
- Deterioration of the financial conditions of our customers could adversely affect our operating results.
- We are subject to the cyclical nature of the semiconductor industry. We may have difficulty accurately predicting our future revenue and appropriately budgeting our expenses.
- The complexity of our solutions could result in unforeseen delays or expenses from undetected defects, errors or bugs in hardware or software which could reduce the market adoption of our new solutions, damage our reputation with current or prospective customers and adversely affect our operating costs.
- We may experience difficulties transitioning to new wafer fabrication process technologies or achieving higher levels of design integration, which may result in reduced manufacturing yields, delays in product deliveries and increased costs.
- Rapidly changing industry standards could make our video and image processing solutions obsolete, which would cause our operating results to suffer.
- Some of our operations and a significant portion of our customers and our subcontractors are located outside of the United States, which subjects us to additional risks, including increased complexity and costs of managing international operations and geopolitical instability.
- We face integration risks relating to our acquisition of Oculii Corp. Any acquisitions we may make in the future could disrupt our business, cause dilution to our shareholders, reduce our financial resources and harm our business.
- We face tax risks, including relating to the complexity of calculating our tax provision, changes in effective tax rates, or unfavorable tax law changes.
- Fluctuations in our operating results on a quarterly and annual basis could cause the market price of our ordinary shares to decline.
- If we do not generate revenue growth, we may not be able to execute our business plan and our operating results could suffer.
- We do not have long-term supply contracts with our third-party manufacturing vendors, and they may not allocate sufficient capacity to us at reasonable prices to meet future demands for our solutions.
- Our customers incorporate components supplied by multiple third parties, and a supply shortage or delay in delivery of these components could delay orders for our solutions by our customers.
- We outsource our wafer fabrication, assembly and testing operations to third parties, and if these parties fail to produce and deliver our products according to requested demands in specification, quantity, cost and time, our reputation, customer relationships and operating results could suffer.
- A substantial portion of our revenue is processed through a single distributor and the loss of this distributor may cause disruptions in our shipments, which may adversely affect our operations and financial condition.

- We are subject to risks associated with our distributors' product inventories.
- We rely on various third party vendors, service providers and contractors in the operation of our business.
- Our ability to sell our products to certain China customers has been restricted. In addition, we are subject to governmental export and import controls that could subject us to liability or impair our ability to compete in international markets, including China.
- Global economic and political conditions, including high inflation and trade restrictions, may impact our business and financial condition in ways that we currently cannot predict.
- We are subject to warranty and product liability claims and to product recalls.
- We are subject to numerous regulatory compliance requirements, which are costly to comply with, and our failure to comply with these requirements could harm our business and operating results.
- Third parties' assertions of infringement of their intellectual property rights could result in our having to incur significant costs and cause our operating results to suffer. Any potential dispute involving our intellectual property could affect our customers, which could trigger our indemnification obligations to them and result in substantial expense to us.

Risks Related to Our Business and Our Industry

Impacts of the global semiconductor supply shortage and high inflation could adversely affect our business, financial condition, and results of operations.

During the COVID-19 global pandemic, various restrictions were put in place causing a temporary decline in demand for certain items. As restrictions began easing across the world, an increase in demand for products containing semiconductor chips exacerbated bottlenecks in the supply chain, resulting in a global semiconductor supply shortage impacting our industry, which resulted in a lengthening of the manufacturing lead time for our products and impacting the normal forecasting and ordering patterns of our customers. With respect to our suppliers, we have in the past experienced supply constraints for certain chips from Samsung and we may in the future experience similar issues. With respect to our customers, to the extent customers face supply chain issues with respect to other components needed to pair with our products in order to produce their end products, such customers may delay future orders of our products or hold inventory of our products for longer periods of time. While we are continuing to work closely with our suppliers and customers to minimize the potential adverse impacts of the supply shortage and longer lead times, we have experienced increased volatility in our business. Recently, some customers have indicated they are reducing their inventory levels as lead times for semiconductor chips and other components used by customers begin to shrink, which may reduce such customers' demand for our products in future periods and harm our financial results. The global supply shortages and uncertainty in customer demand and the worldwide economy in general may be exacerbated by the impacts of high inflation and global banking concerns, and we may experience increased volatility in sales and revenues as a result.

If our customers do not design our solutions into their product offerings, or if our customers' product offerings are not commercially successful, our business would suffer.

We sell our video and image processing system-on-a-chip, or SoC, solutions to original equipment manufacturers, or OEMs, who include our SoCs in their products, and to original design manufacturers, or ODMs, who include our SoCs in the products that they supply to OEMs. We generally refer to ODMs as our customers and OEMs as our end customers, except as otherwise indicated or as the context otherwise requires. Our SoCs are generally incorporated into our customers' products at the design stage, which is referred to as a design win. As a result, we rely on OEMs to design our solutions into the products that they design and sell. Without these design wins, our business would be significantly harmed. We often incur significant expenditures developing a new SoC solution without any assurance that any OEM will select our solution for design into its own product. Once an OEM designs a competitor's device into its product, it becomes significantly more difficult for us to sell our SoC solutions to that OEM because changing suppliers involves significant cost, time, effort and risk for the OEM. We anticipate that it will take longer and require more resources and greater expenditures to achieve design wins, and likely take longer to generate revenue from such design wins, in the new markets we are targeting, such as the OEM automotive and robotics markets, than our legacy camera markets. In addition, trade tensions between the United States and China and potential new export restrictions may make it more difficult to secure future design wins with China customers.

Even if an OEM designs one of our SoC solutions into its product, we cannot be assured that the OEM's product will be commercially successful over time or at all. For example, in the past we have secured design wins for customer products that were never commercially released by our customer or did not sell in volumes initially forecast by the customer, as a result of factors beyond our control. If products incorporating our SoC solutions are not commercially successful or experience rapid decline, our revenue and business will suffer. Similarly, if an OEM designs one of our SoC solutions into its product, we are not assured that we will receive or continue to receive new design wins from that OEM, which could negatively impact our business.

If we fail to penetrate new markets, including the automotive OEM ADAS market, our revenue and financial condition could be harmed.

We believe that our future revenue growth, if any, will significantly depend on our ability to expand within the Intelligence of Things, or IoT, camera markets with our new artificial intelligence, or AI, computer vision SoC solutions, and the OEM automotive, robotics and industrial markets. Each of these markets presents distinct and substantial risks and, in many cases, requires us to develop new functionality or software to address the particular requirements of that market. If any of these markets do not develop as we currently anticipate, the technical requirements of these markets evolve in ways we do not anticipate, the development of such markets is delayed or impacted by factors outside of our control, or if we are unable to penetrate them successfully with our solutions, our revenue could decline and our financial condition would be negatively impacted. Some of these markets are primarily served by only a few large, multinational OEMs with substantial negotiating power relative to us and, in some instances, with internal solutions that are competitive to our products. Meeting the technical requirements and securing design wins with any of these companies requires a substantial investment of our time and resources and we cannot assure you that we will secure design wins from these or other companies or that we will achieve meaningful revenue from the sales of our solutions into these markets. In addition, we face competition from larger competitors with greater resources and more history in these markets. If we fail to penetrate these or other new markets we are targeting, our financial condition would likely suffer. Moreover, if we are successful in achieving design wins in these new markets, it will likely take longer to generate revenue from such design wins than in our traditional markets.

If we fail to develop and introduce new or enhanced solutions that meet market requirements on a timely basis, our ability to attract and retain customers could be impaired and our competitive position could be harmed.

We operate in a dynamic environment characterized by rapidly changing technologies. To compete successfully, we must design, develop, market and sell enhanced solutions that provide increasingly higher levels of performance and functionality and that meet the technical and cost expectations of our customers. Our existing or future solutions could be rendered obsolete by the introduction of new products by our competitors; convergence of other markets with or into the camera market; the market adoption of products based on new or alternative technologies; the emergence of new industry standards applicable to our solutions; or the requirement of additional functionality included in video processors. In addition, some of the markets for our solutions are characterized by frequent introduction of next-generation and new products, short product life cycles, increasing demand for added functionality and significant price competition. As we develop and introduce new solutions, we face the risk that customers may not value or be willing to bear the cost of incorporating these newer solutions into their products, particularly if they believe their customers are satisfied with current solutions. Regardless of the improved features or superior performance of the newer solutions, customers may be unwilling to adopt our new solutions due to design or pricing constraints. If we or our customers are unable to manage product transitions in a timely and cost-effective manner, our business and results of operations would suffer.

Our failure to anticipate or timely develop new or enhanced solutions in response to technological shifts could result in decreased revenue and our competitors achieving design wins that we sought. In particular, we may experience difficulties with product design, development of new software, manufacturing, marketing or qualification that could delay or prevent our development, introduction or marketing of new or enhanced solutions. In addition, for some markets, such as the automotive OEM market, we need to establish and maintain relationships with third-party suppliers or software providers in order to effectively market our solutions to end-customers. Failure to establish these relationships could harm our ability to achieve design wins. Delays in product development could impair our relationships with our customers and negatively impact sales of our solutions under development. If we fail to introduce new or enhanced solutions that meet the needs of our customers or penetrate new markets in a timely fashion, we will lose market share, and our operating results will be adversely affected.

Shortages in, or increased costs of, wafers and materials could adversely impact our gross margins and lead to reduced revenues.

Worldwide manufacturing capacity for silicon wafers is relatively inelastic. If the demand for silicon wafers or assembly material exceeds market supply, our supply of silicon wafers or assembly material could quickly become limited or prohibitively expensive. Silicon wafers constitute a material portion of our product cost and if we are unable to purchase wafers at favorable prices, our results of operations and financial condition will be adversely affected. The semiconductor industry has recently experienced significant shortages of manufacturing capacity, which resulted in a lengthening of the manufacturing lead time for our products and which has at times harmed our revenue. While this capacity shortage has improved, lead times for our products remain longer than normal, which could negatively impact our ability to meet our customer's demand for our products and have an adverse impact on our revenue, results of operations and customer relationships. We have also experienced, during times of supply chain capacity shortages, customers placing orders for our products that exceed their actual demand, which may lead to us manufacturing a surplus of products and could have a negative impact on our results of operations and cash reserves and lead to our customers having excess inventory. Recently, some customers have indicated they are reducing their inventory levels as lead times for semiconductor chips and other components used by customers begin to shrink, which may reduce such customers' demand for our products in future periods and harm our financial results.

Our primary inventory warehouse is located in Hong Kong and may be affected by continued political, social, health and economic conditions in Hong Kong.

We operate a warehouse facility in Hong Kong through which the substantial majority of our finished SoCs are shipped to customers or our logistic partners. Hong Kong has experienced, and continues to experience, political unrest and social strife in addition to the impact of ongoing COVID-19 pandemic and measures to control spread of the virus. The Bureau of Industry and Security, or BIS, has imposed restrictions on exports and reexports of U.S.-controlled items to Hong Kong by imposing stringent licensing requirements similar to those applicable to China. It is possible that the U.S. government may take future measures to impose stricter export controls or duties on shipments made to Hong Kong, which could harm our business, increase the cost of conducting our operations in Hong Kong or result in retaliatory actions against U.S. interests. While we have not been materially impacted by these problems to date, continued deterioration in political, social or economic conditions in Hong Kong or future unforeseen problems, including health pandemics, could affect deliveries of our SoCs to our customers or logistic partners, possibly resulting in business interruptions, substantially delayed or lost sales, loss of inventory, or increased expenses that cannot be passed on to customers, any of which could ultimately have a material adverse effect on our business and financial results. In addition, we could be forced to relocate our warehouse operations, either temporarily or permanently, to another potentially costlier location (or a location resulting in higher tax costs) or find alternative potentially costlier methods of shipping our finished SoCs to customers and logistic partners.

Our target markets may not grow or develop as we currently expect and are subject to market risks, any of which could harm our business, revenue and operating results.

We are focusing our development resources on addressing computer vision applications, primarily in the automotive and IoT markets. The application of computer vision functionality in these markets is relatively new, and we may be unable to predict the timing or development of these markets with accuracy. For example, a slower than expected adoption rate for computer vision technology in automotive or IP security camera applications could slow the demand for our new solutions. If our key target markets do not grow, grow slower, or do not develop in ways that we currently expect, demand for our SoCs may not materialize as expected, and our business and operating results could suffer.

The COVID-19 pandemic has adversely affected our business and could materially and adversely affect our business in the future.

The global COVID-19 pandemic has significantly affected the populations and businesses of many countries. Our business has been, and is expected to continue to be, adversely impacted by the effects of the COVID-19 pandemic. In addition to global macroeconomic effects, the COVID-19 pandemic and related adverse public health developments have caused, and are expected to continue to cause, disruption to our operations. We have had to impose remote or work from home conditions at different times for varying periods of time in most of our offices. Approximately 360 of our employees are located in Taiwan and approximately 220 employees are located in China, and lengthy closures of these offices could significantly disrupt our software engineering and customer support operations. In addition, we and our suppliers, third-party distributors and customers have been, and may in the future again be, disrupted by quarantines and restrictions on certain employees' ability to perform their jobs, office closures or restrictions, disruptions to shipping infrastructure, or other travel or health-related restrictions. Moreover, if there is a significant COVID-19 outbreak that impacts Samsung's ability to manufacture our SoCs or our third-party contractors' ability to assemble, test and ship our products, we could experience delays or reductions in our ability to ship products to our customers.

During fiscal year 2023, we experienced, and we expect to continue to experience, a significant disruption of orders by customers, due in part to impacts of the COVID-19 pandemic. During the first half of fiscal year 2023, we experienced a significant increase in the manufacturing lead time for our products, including supply constraints for certain chips from Samsung Electronics Corporation (Samsung), which disrupted the normal ordering patterns of our customers and harmed our revenue, but which may have in turn led to increased customer demand for our products in order to increase their inventory levels. Recently, customers have indicated they are reducing their inventory levels as lead times for semiconductor chips and other components used by customers shrink, which has reduced, and may continue to reduce, such customers' demand for our products in future periods. High inflation may exacerbate these risks. In addition, decreased consumer demand from the impact of pandemic lockdowns in China contributed to, and could in the future contribute to, decreased revenue in consumer-related markets. There can be no assurance that any decrease in sales resulting from the impacts of the COVID-19 pandemic will be offset by increased sales in subsequent periods.

Our customers may cancel their orders, change production quantities or delay production. If we fail to accurately forecast demand for our solutions, revenue shortfalls or excess, obsolete or insufficient inventory could result.

Our customers typically do not provide us with firm, long-term purchase commitments. A substantial majority of our sales are made on a purchase order basis, which permits our customers to cancel, change or delay their product purchase commitments with little or no notice to us and often without penalty to them. Because production lead times often exceed the amount of time required by our customers to fill their orders, we often must build SoCs in advance of receiving orders from customers, relying on an imperfect demand forecast to project volumes and product mix. As a result of a number of factors, including longer manufacturing times for our products and increased demand from customers during fiscal year 2023, we have increased our inventory levels in the near term. Recently, some customers have indicated they are reducing their inventory levels of our products, which may reduce such customers' demand for our products in future quarters.

Our SoCs are incorporated into products manufactured by or for our end customers, and as a result, demand for our solutions is influenced by the demand for our customers' products. Our ability to accurately forecast demand can be adversely affected by a number of factors, including inaccurate forecasting by our customers, changes in market conditions including reductions in market activity due to the COVID-19 pandemic, adverse changes in our product order mix and fluctuating demand for our customers' products. Even after an order is received, our customers may cancel these orders, request a decrease in production quantities or request a delay in the delivery of our solutions. Any such cancellation, decrease or delay subjects us to a number of risks, most notably that our projected sales will not materialize on schedule or at all, leading to unanticipated revenue shortfalls and excess or obsolete inventory that we may be unable to sell to other customers.

Alternatively, if we are unable to project customer requirements accurately, we may not build enough SoCs, which could lead to delays in product shipments and lost sales opportunities in the near term, as well as force our customers to identify alternative sources, which could affect our ongoing relationships with these customers. In addition, the rapid pace of innovation in our industry could render portions of our inventory obsolete. Excess or obsolete inventory levels could result in unexpected expenses or increases in our reserves that could adversely affect our business, operating results and financial condition.

We depend on a limited number of customers and end customers for a significant portion of our revenue. If we fail to retain or expand our customer relationships, our revenue could decline.

We derive a significant portion of our revenue from a limited number of ODMs who build products on behalf of a limited number of OEMs and from a limited number of OEMs to whom we ship directly. We anticipate that this customer concentration will continue for the foreseeable future. In fiscal year 2023, the customers representing 10% or more of our revenue were WT Microelectronics Co., Ltd., or WT, our distributor, and Chicony Electronics Co., Ltd., or Chicony, a direct ODM customer, which accounted for approximately 57% and 12% of total revenue, respectively. In addition, we believe that revenue from our top 10 OEM customers, either directly or through a distributor or an ODM on behalf of it, accounted for approximately 47% of our total revenue in fiscal year 2023. We believe that our operating results for the foreseeable future will continue to depend on sales to a relatively small number of customers and end customers. In the future, these customers may decide not to purchase our SoC solutions at all, may purchase fewer solutions than they did in the past or may alter their purchasing patterns. As substantially all of our sales to date have been made on a purchase order basis, these customers may cancel, change or delay product purchase commitments with little or no notice to us and often without penalty and may make our revenue volatile from period to period, which has happened in the past. The loss of a significant customer, or substantial reduction in purchases by a significant customer, could happen again at any time and without notice, and such loss would likely harm our financial condition and results of operations. Moreover, because several of our largest OEM customers have a dominant position in their markets, a loss of a significant customer may not be easily replaced.

Achieving design wins is subject to lengthy competitive selection processes that require us to incur significant costs. Even if we begin a product design, a customer may decide to cancel or change its product plans, resulting in no revenue from such expenditures.

We are focused on selling our SoC solutions to ODMs and OEMs for incorporation into their products at the design stage. These efforts to achieve design wins typically are lengthy, especially in emerging markets, such as the OEM automotive market, and in any case can require us to both incur design and development costs and dedicate scarce engineering resources in pursuit of a single customer opportunity. We may not prevail in the competitive selection process, and even when we do achieve a design win, we may never generate any revenue despite incurring development expenditures. In addition, even if an OEM designs one of our SoC solutions into one of its products, we cannot be assured that we will secure new design wins from that OEM for future products. Further, even after securing a design win, we have experienced and may again experience delays in generating revenue from our solutions as a result of the lengthy product development cycle typically required, if we generate any revenue at all as a result of any such design win.

Our customers generally take a considerable amount of time to evaluate our solutions. The typical time from early engagement by our sales force to actual product introduction runs from nine to 12 months for IoT markets and potentially significantly longer in the OEM automotive, robotics and industrial markets. The delays inherent in these lengthy sales cycles increase the risk that a customer will decide to cancel, curtail, reduce or delay its product plans, causing us to lose anticipated sales. In addition, any delay or cancellation of a customer's plans could harm our financial results, as we may have incurred significant expense and generated no revenue. If we were unable to generate revenue after incurring substantial expenses to develop any of our solutions, our business would suffer.

Some of our customers may require our products and our third-party contractors to undergo a qualification process that does not assure product sales. If we are unsuccessful or delayed in qualifying these products or third-party contractors with a customer, our business and operating results could suffer.

Prior to purchasing our products, some of our customers, particularly in the automotive market, may require that our products and our third-party contractors undergo extensive qualification processes, which involve testing of our products in the customers' systems, as well as testing for reliability of our products and our supply chain. This qualification process may take several months and qualification of a product by a customer does not assure any sales of the product to that customer. Even after successful qualification and sales of a product to a customer, a subsequent revision in our third party contractors' manufacturing process or our selection of a new supplier may require a new qualification process, which may result in delays and in our holding excess or obsolete inventory. After our products are qualified, it can take several months or more before the customer commences volume production of components or systems that incorporate our products. Despite these uncertainties, we devote substantial resources, including design, engineering, sales, marketing and management efforts, to qualify our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying these products with a customer, sales of the products to the customer may be precluded or delayed, which may impede our growth and cause our business to suffer.

We expect competition to increase in the future, which could have an adverse effect on our revenue and market share.

The global semiconductor market in general, and the computer vision and video/image processing markets in particular, are highly competitive. We compete in different target markets to various degrees on the basis of a number of competitive factors, including our solutions' performance, features, energy efficiency, size, ease with which our solution may be integrated into our customers' products, customer support, reliability and price, as well as on the basis of our reputation. We expect competition to increase and intensify as more and larger semiconductor companies enter our markets and as existing competitors improve or expand their product offerings. We also expect that the trend among large OEMs to seek to develop their own semiconductor solutions will continue and expand, particularly in camera markets experiencing consolidation, such as the IP security market. In addition, in our newer markets, such as the OEM automotive and robotics markets, we will face competition from larger competitors with longer histories in these markets. Increased competition could result in price pressure, reduced profitability and loss of market share, any of which could harm our business, revenue and operating results.

Our competitors range from large, international companies with greater resources offering a wide range of semiconductor products to smaller, nimble companies specializing in narrow markets. In the IoT market, our primary competitors include AMLogic Inc., Fuzhou Rockchip Electronics Co., Ltd., HiSilicon Technologies Co., Ltd., or HiSilicon, which is owned by Huawei Technologies Co., Ingenic Semiconductor Co., Ltd., Novatek Microelectronics Corp., or Novatek, NVIDIA Corporation, or NVIDIA, OmniVision Technologies, Inc., Qualcomm Incorporated, or Qualcomm, SigmaStar Technology Corp., and Socionext Inc. In the automotive camera market, we compete against Allwinner Technology Co., Ltd., Horizon Robotics Inc., iCatch Technology, Inc., Mobileye, a subsidiary of Intel Corporation, Novatek, NVIDIA, NXP Semiconductors N.V., Qualcomm, Renesas Electronics Corporation, and Texas Instruments. Certain of our customers and suppliers also have divisions that produce products competitive with ours and other customers may seek to vertically integrate competitive solutions in the future. In addition, certain third-party developers of technology competitive to our solutions have licensed their technology, including image signal processing and computer vision IP, which potentially enables a greater number of competitors to offer competitive solutions.

Our ability to compete successfully depends on elements both within and outside of our control. Many of our competitors are substantially larger, have greater financial, technical, marketing, distribution, customer support and other resources, are more established than we are and have significantly better brand recognition and broader product offerings than us, which may enable them to develop and enable new technology into product solutions better or faster than us and to better withstand adverse economic or market conditions in the future. Our ability to compete will depend on a number of factors, including:

- our ability to anticipate market and technology trends and successfully develop solutions that meet market needs;
- our ability to understand the price points and performance metrics of competing products in the marketplace;
- our solutions' performance and cost-effectiveness relative to that of competing products;
- our success in identifying and penetrating new markets, applications and customers;
- our ability to gain access to leading design tools and product specifications at the same time as our competitors;
- our ability to develop and maintain relationships with key OEMs and ODMs;
- our products' effective implementation of video processing or radar standards;
- our ability to protect our intellectual property;
- our ability to expand international operations in a timely and cost-efficient manner;
- our ability to deliver products in volume on a timely basis at competitive prices;
- our ability to support our customers' incorporation of our solutions into their products; and
- our ability to recruit design and application engineers with expertise in computer vision, video and image processing technologies and sales and marketing personnel.

Our competitors may also establish cooperative relationships among themselves or with third parties or acquire companies that provide similar products to ours. As a result, new competitors or alliances may emerge that could acquire significant market share. Any of these factors, alone or in combination with others, could harm our business and result in a loss of market share and an increase in pricing pressure.

A breach of our security systems may have a material adverse effect on our business.

Our security systems are designed to maintain the physical security of our facilities and information systems and protect our customers', suppliers' and employees' confidential information. Accidental or willful security breaches or incidents or other unauthorized access by third parties to our facilities or our information systems or the existence of computer viruses or other malicious code or security vulnerabilities in our data or software could expose us to a risk of loss, unavailability, misappropriation and other unauthorized processing of proprietary and confidential information. The costs to us to eliminate or alleviate cyber or other security problems, bugs, viruses, ransomware and other malicious software programs and security vulnerabilities could be significant, and our efforts to address these problems may not be successful and could result in interruptions and delays that may impede our sales, product distribution, financial reporting or other critical functions. In addition, we could incur significant costs in notifying affected persons and entities and otherwise complying with the multitude of foreign, federal, state and local laws and regulations relating to the unauthorized access to, or use or disclosure of, personal information.

Security breaches and incidents, computer malware and computer hacking attacks have become more prevalent and sophisticated. These threats are constantly evolving, making it increasingly difficult to successfully defend against or implement adequate preventive measures, and we may face difficulties or delays in identifying and otherwise responding to any security breach or incident. Moreover, remote work by our personnel and remote access to our systems have increased significantly, which also increases our cybersecurity risk profile. We expect to incur significant costs in an effort to detect and prevent security breaches and incidents, and we may face increased costs and requirements to expend substantial resources in the event of an actual or perceived security breach or incident. Experienced computer programmers and hackers may be able to penetrate our security controls and misappropriate or compromise our confidential information or that of third parties or create system disruptions. Computer programmers and hackers also may be able to deploy viruses, worms and other malicious software programs that attack our information systems and cause disruptions of our business. For portions of our IT infrastructure, we rely on products and services provided by third parties. These third-party providers may also experience breaches, incidents, and attacks compromising or otherwise impacting their products, and their products may contain security vulnerabilities, each of which could impact our systems. Data security breaches and incidents may also result from non-technical means, including, for example, intentional malfeasance or negligence by an employee or contractor. Any data security breach or incident or theft, misuse, loss, unavailability or other unauthorized processing of this information, or the perception that any of these matters has occurred, could result in, among other things, damage to our reputation, allegations by our customers that we have not performed our contractual obligations, regulatory investigations and other proceedings, litigation by affected parties and possible penalties, damages, and other liabilities, any of which could have a material adverse effect on our business, financial condition, our reputation, and our relationships with our customers and partners. We may also encounter errors resulting in corruption or loss of data, an inability to accurately process or record transactions, and security or technical reliability issues. All of these could harm our ability to conduct core operating functions such as processing purchase orders and invoices, product distribution, recording and reporting financial and management information on a timely and accurate basis, and could impact our internal control compliance efforts. Due to political uncertainty and military actions associated with the ongoing hostility between Russia and Ukraine, we and our vendors, contractors, and other third parties we work with are vulnerable to a heightened risk of cybersecurity attacks, phishing attacks, viruses, malware, ransomware, hacking or similar breaches and incidents from nation-state and affiliated actors, including attacks that could materially disrupt our supply chain and our systems and operations.

We also rely on a number of third-party "cloud-based" service providers of corporate infrastructure services relating to, among other things, human resources, electronic communication services and some finance functions, and we are, of necessity, dependent on the security systems of these providers. These third-party service providers also are subject to similar, and in certain cases greater, security threats. Any unauthorized access by third parties to the systems of our cloud-based service providers, any other security breaches or incidents impacting such systems, or the existence of computer viruses, ransomware or other malicious code in their data or software could expose us to a risk of loss, misappropriation, unavailability and other unauthorized processing of information.

Additionally, we cannot be certain that our insurance coverage will be adequate or otherwise protect us with respect to claims, expenses, fines, penalties, business loss, data loss, litigation, regulatory actions, or other impacts arising from security breaches or incidents, or that such coverage will continue to be available on acceptable terms or at all. Any of these results could adversely affect our business, financial condition, and operating results.

While we intend to continue to invest in research and development, we may be unable to make the substantial investments that are required to remain competitive in our business.

The semiconductor industry requires substantial investment in research and development in order to bring to market new and enhanced solutions. Our research and development expense was \$204.9 million, \$167.3 million and \$140.8 million in fiscal years 2023, 2022 and 2021, respectively. We expect to increase our research and development expenditures as compared to prior periods as part of our strategy of focusing on the development of innovative computer vision, video and image processing solutions with increased functionality, and as we target new markets, such as the automotive OEM and robotics markets. We are unable to predict whether we will have sufficient resources to achieve the level of investment in research and development required to remain competitive. For example, development in the latest process nodes, such as 5 nanometer, or nm, or smaller, costs significantly more than required to develop in larger process nodes, such as 14 or 10nm. This added cost could prevent us from being able to maintain a technology advantage over larger competitors that have significantly more resources to invest in research and development. In addition, we cannot assure you that the technologies which are the focus of our research and development expenditures will become commercially successful or generate any revenue.

The loss of any of our key personnel could seriously harm our business.

We believe our future success depends in large part upon the continuing services of the members of our senior management team and various engineering and other technical personnel. If one or more of our senior executives or other key personnel are unable or unwilling to continue in their present positions, we may not be able to replace them easily or at all, our business may be disrupted, and our financial condition and results of operations may be materially and adversely affected. In addition, if any member of our senior management team or any of our other key personnel joins a competitor or forms a competing company, we may experience material disruption of our operations and development plans and lose customers, know-how and key professionals and staff members, and we may incur increased operating expenses as the attention of other senior executives is diverted to recruit replacements for key personnel.

We rely on highly skilled personnel and, if we are unable to hire, retain or motivate key personnel, we may not be able to grow effectively.

Our performance largely depends on the talents and efforts of highly skilled individuals. Our future success depends on our continuing ability to identify, hire, develop, motivate, and retain highly skilled personnel for all areas of our organization. Our industry is characterized by high demand and intense competition for talent, particularly for engineering personnel. The pool of qualified candidates is limited, particularly in Silicon Valley and parts of Asia for very-large-scale integration, or VLSI, and artificial intelligence and computer vision engineers, and certain of our competitors and potential competitors with greater resources have directly targeted our employees. In addition, we also face competition in hiring artificial intelligence engineers, including from companies with which we do not directly compete. Our compensation arrangements, such as our equity award programs, may not always be successful in attracting new employees and retaining and motivating our existing employees. Our continued ability to compete effectively, and to grow our business, depends on our ability to attract new employees and to retain and motivate our existing employees.

The average selling prices of semiconductor solutions in our target markets have typically decreased over time and will likely do so in the future, which could harm our revenue and gross margins.

Average selling prices of semiconductor products in the markets we serve have historically decreased over time, and we expect such declines to occur for our solutions over time. Our gross margins and financial results will suffer if we are unable to offset reductions in our average selling prices by reducing our costs, developing new or enhanced SoC solutions, such as our new AI computer vision-based solutions, on a timely basis with higher selling prices or gross margins, or increasing our sales volumes. Additionally, because we do not operate our own manufacturing, assembly or testing facilities, we may not be able to reduce our costs as rapidly as companies that operate their own facilities, and our costs may even increase, which could also reduce our gross margins. In the past, we have reduced the prices of our SoC solutions in anticipation of future competitive pricing pressures, new product introductions by us or our competitors and other factors. We expect that we will have to address pricing pressures again in the future, particularly in markets experiencing consolidation, which could require us to reduce the prices of our SoC solutions and harm our operating results.

If we are unable to manage any future growth, we may not be able to execute our business plan and our operating results could suffer.

Our business has grown rapidly in the past. Our future operating results depend to a large extent on our ability to successfully manage any expansion and growth, including the challenges of managing a company with an executive management team in the United States and the majority of its employees in Asia. We are increasing our investment in research and development and other functions to grow our business and address new markets, such as the OEM automotive and robotics markets. To manage growth successfully, we believe we must effectively, among other things:

- recruit, hire, train and manage additional qualified engineers for our research and development activities, particularly for the positions of semiconductor design and systems, AI computer vision development and applications engineering;
- add additional sales and business development personnel;
- maintain and improve our administrative, financial and operational systems, procedures and controls;
- enhance our information technology support for enterprise resource planning and design engineering by adapting and expanding our systems and tool capabilities, and properly training new hires as to their use; and
- be able to secure sufficient manufacturing capacity.

We are likely to incur the costs associated with these increased investments earlier than some of the anticipated benefits, and the return on these investments, if any, may be lower, may develop more slowly than we expect or may not materialize. If we are unable to manage growth effectively, we may not be able to take advantage of market opportunities or develop new solutions, and we may fail to satisfy customer product or support requirements, maintain product quality, execute our business plan or respond to competitive pressures.

Deterioration of the financial conditions of our customers could adversely affect our operating results.

Deterioration of the financial condition of our distributors or customers could adversely impact our collection of accounts receivable. For the fiscal year ended January 31, 2023, the customers representing 10% or more of revenue were WT and Chicony, which accounted for approximately 57% and 12% of total revenue, respectively. As of January 31, 2023, accounts receivable with WT and Chicony were approximately \$21.0 million and \$9.4 million, respectively. We regularly review the collectability and creditworthiness of our distributors and customers to determine an appropriate allowance for credit losses. Based on our review of our distributors and customers, we currently have only immaterial reserves for uncollectible accounts. If our uncollectible accounts, however, were to exceed our current or future allowance for credit losses, our operating results would be negatively impacted.

We are subject to the cyclical nature of the semiconductor industry.

The semiconductor industry is highly cyclical and is characterized by constant and rapid technological change, rapid product obsolescence, price erosion, evolving standards, short product life cycles and wide fluctuations in product supply and demand. Cyclical downturns have been characterized by diminished product demand, production overcapacity, high inventory levels and accelerated erosion of average selling prices, which could harm our business and operating results. We are dependent on the availability of third-party foundry and assembly capacity to manufacture and assemble our SoC solutions. None of our third-party foundry or assembly contractors has provided assurances that adequate capacity will be available to us in the future. The semiconductor industry recently experienced significant shortages of capacity, which resulted in a lengthening of the manufacturing lead time for our products. Such capacity shortages could negatively impact our ability to meet our customers' demand for our products and have an adverse impact on our revenue, results of operations and customer relationships. We have also experienced, during times of supply chain capacity shortage, customers placing orders for our products that exceed their actual demand, which may lead to us manufacturing a surplus of products and could have a negative impact on our results of operations and cash reserves. Most recently, some customers have indicated their intent to reduce their inventory levels as capacity shortages improve, which may decrease such customers' demand for our solutions in future periods and, in turn, harm our financial results.

The complexity of our solutions could result in unforeseen delays or expenses from undetected defects, errors or bugs in hardware or software which could reduce the market adoption of our new solutions, damage our reputation with current or prospective customers and adversely affect our operating costs.

Highly complex SoC solutions such as ours frequently contain defects, errors and bugs when they are first introduced or as new versions are released. We have in the past and may in the future experience these defects, errors and bugs. If any of our solutions have reliability, quality or compatibility problems, we may not be able to successfully correct these problems in a timely manner or at all. In addition, if any of our proprietary features contain defects, errors or bugs when first introduced or as new versions of our solutions are released, we may be unable to timely correct these problems. Consequently, our reputation may be damaged and customers may be reluctant to buy our solutions, which could harm our ability to retain existing customers and attract new customers, and could adversely affect our financial results. In addition, these defects, errors or bugs could interrupt or delay sales to our customers. If any of these problems are not found until after we have commenced commercial production of a new product, we may incur significant additional development costs and product recall, repair or replacement costs. These problems may also result in claims against us by our customers or others.

We may experience difficulties in transitioning to new wafer fabrication process technologies or in achieving higher levels of design integration, which may result in reduced manufacturing yields, delays in product deliveries and increased costs.

We aim to use the most advanced manufacturing process technology appropriate for our products that is available from our third-party foundries. As a result, we periodically evaluate the benefits of migrating our solutions to smaller geometry process technologies in order to improve performance and reduce costs. We believe this strategy will help us remain competitive. We may face difficulties, delays and increased expense as we transition our products to new processes, such as the 4nm or 3nm process nodes, and potentially to new foundries. We currently depend on Samsung, as the principal foundry for our products, to transition to new processes successfully. We cannot assure you that Samsung will be able to effectively manage such transitions or that we will be able to maintain our relationship with Samsung or develop relationships with new foundries. Moreover, as we utilize more advanced process nodes beyond 5nm, we are increasingly dependent upon a very small number of foundries currently available for certain advanced process technologies. If we or our foundry vendors experience significant delays in transitioning to smaller geometries or fail to efficiently implement transitions, we could experience reduced manufacturing yields, delays in product deliveries and increased costs, all of which could harm our relationships with our customers and our operating results.

Rapidly changing industry standards could make our video and image processing solutions obsolete, which would cause our operating results to suffer.

We design our video and image processing solutions to conform to video compression standards, including MPEG-2, H.264 Advanced Video Coding (AVC) and H.265 High Efficiency Video Coding (HEVC), set by industry standards setting bodies such as ITU-T Video Coding Experts Group and the ISO/IEC Moving Picture Experts Group. Generally, our solutions comprise only a part of a camera device. All components of these devices must uniformly comply with industry standards in order to operate efficiently together. We depend on companies that provide other components of the devices to support prevailing industry standards. Many of these companies are significantly larger and more influential in driving industry standards than we are. Some industry standards may not be widely adopted or implemented uniformly, and competing standards may emerge that may be preferred by our customers or by consumers. If our customers or the suppliers that provide other device components adopt new or competing industry standards with which our solutions are not compatible, or if the industry groups fail to adopt standards with which our solutions are compatible, our existing solutions would become less desirable to our customers. If our solutions are not in compliance with prevailing industry standards for a significant period of time, we could miss opportunities to achieve crucial design wins, which could harm our business. As a result, our sales would suffer, and we could be required to make significant expenditures to develop new SoC solutions to ensure compliance with relevant standards.

Some of our operations and a significant portion of our customers and our subcontractors are located outside of the United States, which subjects us to additional risks, including increased complexity and costs of managing international operations and geopolitical instability.

We have research and development design centers and business development offices in China, Germany, Italy, Japan, South Korea and Taiwan, and we expect to continue to conduct business with companies that are located outside the United States, particularly in Asia. We purchase wafers from foreign foundries, have our solutions assembled and tested by subcontractors located in Asia, and supply our solutions to customers located outside of the United States. Even customers of ours that are based in the United States often use contract manufacturers based in Asia to manufacture their products, and these contract manufacturers typically purchase products directly from us. As a result of our international focus, we face numerous challenges and risks, including:

- increased complexity and costs of managing international operations;
- longer and more difficult collection of receivables from customers;
- difficulties in enforcing contracts generally;
- regional economic instability;
- geopolitical instability and military conflicts, including the ongoing conflict in Ukraine;
- limited protection of our intellectual property and other assets;
- compliance with local laws and regulations and unanticipated changes in local laws and regulations, including tax laws and regulations;
- trade and foreign exchange restrictions and higher tariffs;
- travel restrictions;
- timing and availability of import and export licenses and other governmental approvals, permits and licenses, including export classification requirements;
- foreign currency exchange fluctuations relating to our international operating activities;
- restrictions imposed by the U.S. government on our ability to do business with certain companies or in certain countries as a result of international political conflicts;
- transportation delays and other consequences of limited local infrastructure, and disruptions, such as large-scale outages or interruptions of service from utilities or telecommunications providers;
- heightened risk of terrorist acts;
- local business and cultural factors that differ from standards and practices in the U.S.;
- differing employment practices and labor relations;
- regional health issues, pandemics, and natural disasters; and
- work stoppages.

We face integration risks relating to our acquisition of Oculii Corp.

In November 2021, we completed our acquisition of Oculii Corp. The benefits we expect to realize from this acquisition will depend, in part, on our ability to integrate the businesses successfully and efficiently.

We acquired Oculii with the expectation that the merger will result in various benefits to us, including certain technology and operational efficiencies or synergies. To realize these anticipated benefits, the businesses and certain technologies of Ambarella and Oculii must be successfully integrated. This integration has been complex and time consuming and requires substantial resources and effort. If the businesses or technology are not successfully integrated, the anticipated benefits of the merger may not be realized fully or at all or may take longer to realize than expected. In addition, the acquisition may also result in significant charges or other liabilities, including taxes, that could adversely affect our results of operations.

Any acquisitions we may make in the future could disrupt our business, cause dilution to our shareholders, reduce our financial resources and harm our business.

Prior to our acquisition of Oculii in 2021, we had not made any acquisitions since our acquisition of VisLab S.r.l. in 2015. Our ability to make and successfully integrate acquisitions is largely unproven. Any future acquisitions may not strengthen our competitive position and may be viewed negatively by our customers, financial markets or investors, and we may not achieve our goals in a timely manner, or at all. In addition, any acquisitions we make could lead to difficulties in integrating personnel, technologies and operations from the acquired businesses and in retaining and motivating key personnel from these businesses. Acquisitions may disrupt our ongoing operations, divert management from their primary responsibilities, subject us to additional liabilities, increase our expenses and adversely impact our business, operating results, financial condition and cash flows. Acquisitions may also reduce our cash available for operations and other uses, and could also result in an increase in amortization expense related to identifiable assets acquired, potentially dilutive issuances of equity securities or the incurrence of debt, any of which could harm our business.

The complexity of calculating our tax provision may result in errors that could result in restatements of our financial statements.

We are incorporated in the Cayman Islands and our operations are subject to income and transaction taxes in the United States, China, Hong Kong, Germany, Italy, Japan, South Korea, Taiwan and other jurisdictions in which we do business. Due to the complexity associated with the calculation of our tax provision, we have hired independent tax advisors to assist us. If we or our independent tax advisors fail to resolve or fully understand certain issues, there may be errors that could result in us having to restate our financial statements. The risk of errors may be exacerbated by the significant number of tax law changes recently enacted in the United States and other jurisdictions. Restatements are generally costly and could adversely impact our results of operations or have a negative impact on the trading price of our ordinary shares.

Risks Related to Our Financial Performance or Results

Fluctuations in our operating results on a quarterly and annual basis could cause the market price of our ordinary shares to decline.

Our revenue and operating results have fluctuated significantly from period to period in the past and are likely to do so in the future. As a result, you should not rely on period-to-period comparisons of our operating results as an indication of our future performance. It is also possible that our normal seasonal patterns will be impacted by ongoing macroeconomic uncertainty, effects of the COVID-19 pandemic, recent supply chain disruptions and semiconductor capacity shortages, and high inflation. In future periods, our forecasted or actual revenue and results of operations may be below the expectations of analysts and investors, which could cause the market price of our ordinary shares to decline.

Factors that may affect our operating results include:

- fluctuations in demand, sales cycles, product mix, and prices for our products;
- the forecasting, scheduling, rescheduling or cancellation of orders by our customers;
- shifts in consumer or manufacturer preferences and any resultant change in demand for our customers' products;
- changes in the competitive dynamics of our markets, including new entrants or pricing pressures;
- delays in our customers' ability to manufacture and ship products that incorporate our solutions caused by internal and external factors beyond our control;
- our ability to successfully define, design and release new solutions in a timely manner that meet our customers' needs;
- timely availability of adequate manufacturing capacity from our manufacturing subcontractors;
- changes in manufacturing costs, including wafer, test and assembly costs, mask costs, manufacturing yields and product quality and reliability;
- the timing of product announcements by our competitors or by us;
- incurrence of research and development and related new products expenditures;
- write-downs of inventory for excess quantities and technological obsolescence;
- impairment of investment or other asset values;
- future accounting pronouncements and changes in accounting policies;

- volatility in our share price, which may lead to higher stock-based compensation expense;
- volatility in our effective tax rate;
- general socioeconomic and political conditions in the countries where we operate or where our products are sold or used, including recent macroeconomic volatility, the COVID-19 pandemic, U.S.-China relations and the conditions in Hong Kong; and
- costs associated with litigation, especially related to intellectual property.

Moreover, the semiconductor industry has historically been cyclical in nature, reflecting overall economic conditions as well as budgeting and buying patterns of consumers. For example, the semiconductor industry recently experienced significant shortages of capacity, which resulted in a lengthening of the manufacturing lead time for our products and could be impacting the normal forecasting and ordering patterns of our customers. Most recently, some customers have indicated their intent to reduce their inventory levels as capacity shortages improve, which may decrease such customers' demand for our products in future periods, which could harm our financial results. We expect these cyclical conditions to continue. As a result, our quarterly operating results are difficult to predict, even in the near term. Our expense levels are relatively fixed in the short term and are based, in part, on our expectations of future revenue. If revenue levels are below our expectations, we may experience material adverse impacts on our business, including declines in margins and profitability, or incur losses.

If we do not generate revenue growth, we may not be able to execute our business plan and our operating results could suffer.

We believe that our future revenue growth, if any, will significantly depend on our ability to expand within our existing IoT camera markets, such as the existing professional and home security and monitoring camera markets, and successfully penetrate new markets, such as the OEM automotive, robotics and industrial markets, with our new AI computer vision-based SoC solutions. We believe that executing upon our business plan requires us to continue to develop new SoCs and new software to address the particular requirements of these markets. Accordingly, we continue to invest in the development of new technology and solutions and expect our research and development expenditures to increase compared to prior periods. If we are unable to generate or maintain adequate revenue growth, our financial results could suffer and we may not be able to continue to invest in the development of new technology and solutions required to be successful.

We may have difficulty accurately predicting our future revenue and appropriately budgeting our expenses.

The rapidly evolving nature of the markets in which we sell our solutions, combined with substantial uncertainty concerning how these markets may develop, the considerable amount of time our customers generally take to evaluate our solutions, and other factors beyond our control, limits our ability to accurately forecast quarterly or annual revenue. In the recent years, we expanded our staffing and increased our expenditures in anticipation of future revenue growth. If our revenue does not increase as anticipated, we could incur significant losses due to our higher expense levels if we are not able to decrease our expenses in a timely manner to offset any shortfall in future revenue. Continued or persistent losses may require us to obtain additional capital that may not be available on reasonable terms or at all.

Changes to financial accounting standards may affect our results of operations and could cause us to change our business practices.

We prepare our consolidated financial statements to conform to generally accepted accounting principles, or GAAP, in the United States. These accounting principles are subject to interpretation by the American Institute of Certified Public Accountants, the SEC and various bodies formed to interpret and create accounting rules and regulations. Changes in those accounting rules could have a significant effect on our financial results, require significant resources, pose challenges in forecasting revenue and may affect our reporting of transactions completed before a change is announced. Changes to those rules or the questioning of current practices may adversely affect our reported financial results or the way we conduct our business.

Fluctuations in exchange rates between and among the currencies of the countries in which we do business may adversely affect our operating results.

Our sales have been historically denominated in U.S. dollars. An increase in the value of the U.S. dollar relative to the currencies of the countries in which our end customers operate could impair the ability of our end customers to cost-effectively integrate our SoCs into their devices which may materially affect the demand for our solutions and cause these end customers to reduce their orders, which would adversely affect our revenue and business. We may experience foreign exchange gains or losses due to the volatility of other currencies compared to the U.S. dollar. A significant portion of our solutions are sold to customers located outside the United States, primarily in Asia. Sales to customers in Asia accounted for approximately 82%, 88% and 88% of our total revenue in fiscal years 2023, 2022 and 2021, respectively. Because most of our end customers or their ODM manufacturers are located in Asia, we anticipate that a majority of our future revenue will continue to come from sales to that region. Although a large percentage of our sales are made to customers in Asia, we believe that a significant number of the products designed by these customers and incorporating our SoCs are then sold to consumers globally. In addition, if in the future we sell products or purchase inventory in currencies other than the U.S. dollar, our exposure to foreign currency risk could become more significant.

A significant number of our employees are located in Asia, principally Taiwan and China, and Europe. Therefore, a portion of our payroll as well as certain other operating expenses are paid in currencies other than the U.S. dollar, such as the New Taiwan Dollar, the Chinese Yuan Renminbi and the Eurozone Euro. Our operating results are denominated in U.S. dollars and the difference in exchange rates in one period compared to another may directly impact period-to-period comparisons of our operating results. Furthermore, currency exchange rates, particularly the exchange rates between the Chinese Yuan Renminbi and the U.S. dollar, between the New Taiwan Dollar and the U.S. dollar, and between the Eurozone Euro and the U.S. dollar, have been volatile in the recent past and these currency fluctuations may make it difficult for us to predict our operating results.

We have not implemented any hedging strategies to mitigate risks related to the impact of fluctuations in currency exchange rates. Even if we were to implement hedging strategies, not every exposure can be hedged and, where hedges are put in place based on expected foreign exchange exposure, they are based on forecasts which may vary or which may later prove to have been inaccurate. Failure to hedge successfully or anticipate currency risks accurately could adversely affect our operating results.

We cannot predict our future capital needs, and we may not be able to obtain additional financing to fund our operations.

We may need to raise additional funds in the future. Any required additional financing may not be available on terms acceptable to us, or at all. If we raise additional funds by issuing equity securities or convertible debt, investors may experience significant dilution of their ownership interest, and the newly-issued securities may have rights senior to those of the holders of our ordinary shares. If we raise additional funds by obtaining loans from third parties, the terms of those financing arrangements may include negative covenants or other restrictions on our business that could impair our operational flexibility and would also require us to incur interest expense. If additional financing is not available when required or is not available on acceptable terms, we may have to scale back our operations or limit our production activities, and we may not be able to expand our business, develop or enhance our products, take advantage of business opportunities or respond to competitive pressures which could result in lower revenue and reduce the competitiveness of our products.

Our marketable securities portfolio could experience a decline in market value or otherwise become illiquid, which could materially and adversely affect our financial results.

As of January 31, 2023, we had approximately \$101.2 million in money market funds and debt security investments. The debt security investments consisted of commercial paper, debt securities of corporations or corporate bonds, asset-backed securities and U.S. government securities. We currently do not use derivative financial instruments to adjust our investment portfolio risk or income profile. These investments, as well as any cash deposited in bank accounts, are subject to general credit, liquidity, market and interest rate risks, which may be exacerbated by unusual events, such as the COVID-19 pandemic, the Eurozone crisis and the U.S. debt ceiling crisis, which affected various sectors of the financial markets and led to global credit and liquidity issues. For example, in March 2023, Silicon Valley Bank (SVB) was closed and the Federal Deposit Insurance Corporation (FDIC) was appointed as receiver. At the time of closing on March 10, 2023, we had cash deposits with SVB of approximately \$17.0 million. We also had cash equivalents and marketable debt security investments residing in custodial accounts held by U.S. Bank for which SVB Asset Management was the investment advisor until March 15, 2023. While we were able to recover all deposited amounts from SVB, there can be no assurance that our current or future banks will not face similar risks as SVB or that we will be able to recover in full our deposits in the event of similar closures. We regularly maintain cash balances that are not insured or are in excess of the FDIC's insurance limit. If the global financial markets continue to experience volatility or deteriorate, our investment portfolio may be impacted and some or all of our investments may become illiquid or otherwise experience loss which could adversely impact our financial results and position. To the extent that we increase the amount of our security investments in the future, these risks would be exacerbated.

Risks Related to Our Dependence on Third Parties

We do not have long-term supply contracts with our third-party manufacturing vendors, and they may not allocate sufficient capacity to us at reasonable prices to meet future demands for our solutions.

The semiconductor industry is subject to intense competitive pricing pressure from customers and competitors. Accordingly, any increase in the cost of our solutions, whether by adverse purchase price variances or adverse manufacturing cost variances, will reduce our gross margins and operating profit. We currently do not have long-term supply contracts with most of our primary third-party vendors, and we negotiate pricing with our main vendors on a purchase order-by-purchase order basis. Therefore, they are not obligated to perform services or supply product to us for any specific period, in any specific quantities, or at any specific price, except as may be provided in a particular purchase order. The ability of our foundry vendors to provide us with a product, which is solely sourced at each foundry, is limited by their available capacity, existing obligations and technological capabilities. Foundry capacity may not be available when we need it or at reasonable prices. None of our third-party foundry or assembly and test vendors have provided contractual assurances to us that adequate capacity will be available to us to meet our anticipated future demand for our solutions. Moreover, availability of foundry capacity at our primary foundry vendor has tightened recently, which could limit the volume of products we can produce and/or delay production of new products, both of which would negatively impact our business and operations. Similarly, our assembly vendors have recently experienced shortages of certain substrates necessary for the production of our solutions due in part to COVID-19, which has negatively impacted the production time of our devices. If these conditions continue for a substantial period or worsen, our ability to meet our anticipated demand for our solutions could be impacted which, in turn, could negatively impact our operations and financial results.

Our foundry and assembly and test vendors may allocate capacity to the production of other companies' products while reducing deliveries to us on short notice. In particular, other companies that are larger and better financed than we are or that have long-term agreements with our foundry or assembly and test vendors may cause our foundry or assembly and test vendors to reallocate capacity to them, decreasing the capacity available to us. Converting or transferring manufacturing from a primary location or supplier to a backup provider could be expensive and would likely take at least two or more quarters. There are only a few foundries, including Samsung and Taiwan Semiconductor Manufacturing Co., Ltd., or TSMC, that are currently available for certain advanced process technologies that we utilize or may utilize, such as 10nm or 5nm. Accordingly, as we continue to develop solutions in advanced process nodes, we will be increasingly dependent upon such foundries. The unavailability of one or both of these foundries could significantly impact our ability to produce our new products or delay production, which would negatively impact our business.

Our customers incorporate components supplied by multiple third parties, and a supply shortage or delay in delivery of these components could delay orders for our solutions by our customers.

Our customers purchase components used in the manufacture of their products from various sources of supply, often involving several specialized components, including lenses, sensors, microcontrollers, power management integrated circuits (PMICs), Wi-Fi chips, and memory chips. Any supply shortage or delay in delivery by third-party component suppliers, or a third-party supplier's cessation or shut down of its business, may prevent or delay production of our customers' products. As a result of delays in delivery or supply shortages of third-party components, orders for our solutions may be delayed or canceled and our business may be harmed. For example, the semiconductor industry recently experienced shortages of certain devices, including microcontrollers, PMICs, Wi-Fi chips, which impacted our customers' ability to build their products and negatively impact our customers' demand for our solutions. We believe these shortages were exacerbated by the COVID-19 pandemic. Similarly, our ability to generate design wins in some markets, such as the automotive OEM market, requires us to collaborate with third-party software suppliers in order to offer a complete solution to customers. Our inability to successfully collaborate with such third-party suppliers, or such suppliers' inability to develop and deliver software, could harm our ability to achieve design wins and harm our business.

We outsource our wafer fabrication, assembly and testing operations to third parties, and if these parties fail to produce and deliver our products according to requested demands in specification, quantity, cost and time, our reputation, customer relationships and operating results could suffer.

We rely on third parties for substantially all of our manufacturing operations, including wafer fabrication, assembly and testing. Currently, the majority of our SoCs are supplied by Samsung in facilities located in Austin, Texas and South Korea, from whom we have the option to purchase both fully assembled and tested products as well as tested die in wafer form for assembly. Samsung subcontracts the assembly and initial testing of the assembled chips it supplies to us to Signetics Corporation and STATS ChipPAC Ltd. In the case of purchases of tested die from Samsung, we contract the assembly to Advanced Semiconductor Engineering, Inc., or ASE. Final testing of all of our products is handled by Sigurd Corporation or King Yuan Electronics Co., Ltd. under the supervision of our engineers. We depend on these third parties to supply us with material of a requested quantity in a timely manner that meets our standards for yield, cost and manufacturing quality. Availability of capacity within our supply chain tightened during fiscal year 2023, which at times limited the volume of products we can produce, negatively impacting our business and operations, and similar capacity constraints may adversely affect our business in the future. Moreover, because each SoC is fabricated in only one manufacturing facility, or single sourced, any disruption to a facility could cause significant delays in the production or shipment of the products produced in that facility that could not be easily offset by having such product(s) produced in another facility. We do not have any long-term supply agreements with any of our manufacturing suppliers. If one or more of these vendors terminates its relationship with us, or if we encounter any problems with our manufacturing supply chain, including available capacity constraints, our ability to ship our solutions to our customers on time and in the quantity required would be adversely affected, which in turn could cause an unanticipated decline in our sales and damage our customer relationships.

If, in the future, we enter into arrangements with suppliers that include additional fees to expedite delivery, nonrefundable deposits or loans in exchange for capacity commitments or commitments to purchase specified quantities over extended periods, such arrangements may be costly, reduce our financial flexibility and be on terms unfavorable to us, if we are able to secure such arrangements at all. To date, we have not entered into any such arrangements with our suppliers. If we need additional foundry or assembly and test subcontractors because of increased demand or the inability to obtain timely and adequate deliveries from our current vendors, we may not be able to do so cost-effectively, if at all.

A substantial portion of our revenue is processed through a single distributor and the loss of this distributor may cause disruptions in our shipments, which may adversely affect our operations and financial condition.

We sell a significant percentage of our solutions through a single distributor, WT, which serves as our non-exclusive sales representative in Asia, other than Japan. Approximately 57%, 62% and 63% of our revenue was derived from sales through WT for the fiscal years ended January 31, 2023, 2022 and 2021, respectively. We anticipate that a significant portion of our revenue will continue to be derived from sales through WT in the foreseeable future. Our current agreement with WT is effective until January 2026, unless it is terminated earlier by either party for any or no reason with 60 days written notice or by failure of the breaching party to cure a material breach within 30 days following written notice of such material breach by the non-breaching party. Our agreement with WT will automatically renew for additional successive 12-month terms unless at least 60 days before the end of the then-current term either party provides written notice to the other party that it elects not to renew the agreement. Termination of the relationship with WT, either by us or by WT, could result in a temporary or permanent loss of revenue. We may not be successful in finding suitable alternative distributors on satisfactory terms, or at all, and this could adversely affect our ability to effectively sell our solutions in certain geographical locations or to certain end customers. Furthermore, WT, or any successor or other distributors we do business with, may face issues obtaining credit, which could impair their ability to make timely payments to us.

We are subject to risks associated with our distributors' product inventories.

We sell many of our products to customers through distributors who maintain their own inventory of our products for sale to ODMs and end customers. We allow limited price adjustments on sales to distributors. Price adjustments may be effected by way of credits for future product or by cash payments to the distributor, either in arrears or in advance, using estimates based on historical transactions. In accordance with ASC 606, we recognize revenue on sales to distributors upon shipment and transfer of control (known as “sell-in” revenue recognition) based on the amount of consideration expected to be received. To the extent that the actual consideration received is materially different from estimated variable consideration recognized, we may be required to adjust revenue in subsequent periods.

If our distributors are unable to sell an adequate amount of their inventory of our products in a given quarter to ODMs and end customers, or if they decide to decrease their inventories for any reason, such as adverse global economic conditions or a downturn in technology spending, our sales to these distributors and our revenues may decline. We also face the risk that our distributors may purchase, or for other reasons accumulate, inventory levels of our products in any particular quarter in excess of future anticipated sales to end customers. If such sales do not occur in the time frame anticipated by these distributors for any reason, these distributors may substantially decrease the amount of product they order from us in subsequent periods until their inventory levels realign with end-customer demand, which would harm our business and could adversely affect our revenues in such subsequent periods. Recently, some end customers have indicated they are seeking to reduce their inventory levels, which may reduce such customers' demand for our products, including products purchased through our distributors, in future periods and harm our financial results.

If our foundry vendors do not achieve satisfactory yields or quality, our reputation and customer relationships could be harmed.

The fabrication of our video and image processing SoC solutions is a complex and technically demanding process. Minor deviations in the manufacturing process can cause substantial decreases in yields, and in some cases, cause production to be suspended. Our foundry vendors, from time to time, experience manufacturing defects and reduced manufacturing yields, including in the fabrication of our SoCs. Changes in manufacturing processes or the inadvertent use of defective or contaminated materials by our foundry vendors could result in lower than anticipated manufacturing yields or unacceptable performance of our SoCs. Many of these problems are difficult to detect at an early stage of the manufacturing process and may be time consuming and expensive to correct. Poor yields from our foundry vendors, or defects, integration issues or other performance problems in our solutions, could cause us significant customer relations and business reputation problems, harm our financial results and give rise to financial or other damages to our customers. Our customers might consequently seek damages from us for their losses. A product liability claim brought against us, even if unsuccessful, would likely be time consuming and costly to defend.

Each of our SoC solutions is manufactured at a single location. If we experience manufacturing problems at a particular location, we would be required to transfer manufacturing to a new location or supplier. Converting or transferring manufacturing from a primary location or supplier to a backup fabrication facility could be expensive and could take two or more quarters. During such a transition, we would be required to meet customer demand from our then-existing inventory, as well as any partially finished goods that could be modified to the required product specifications. We do not seek to maintain sufficient inventory to address a lengthy transition period because we believe it is uneconomical. As a result, we may not be able to meet customer needs during such a transition, which could delay shipments, cause production delays, result in a decline in our sales and damage our customer relationships.

We rely on third-party vendors to supply software development tools to us for the development of our new products, and we may be unable to obtain the tools necessary to develop or enhance new or existing products.

We rely on third-party software development tools to assist us in the design, simulation and verification of new products or product enhancements. To bring new products or product enhancements to market in a timely manner, or at all, we need software development tools that are sophisticated enough or technologically advanced enough to complete our design, simulations and verifications. In the future, the design requirements necessary to meet consumer demands for more features and greater functionality from our solutions may exceed the capabilities of available software development tools. Unavailability of software development tools may result in our missing design cycles or losing design wins, either of which could result in a loss of market share or negatively impact our operating results.

Because of the importance of software development tools to the development and enhancement of our solutions, our relationships with leaders in the computer-aided design industry, including Cadence Design Systems, Inc., Mentor Graphics Corporation and Synopsys, Inc., are critical to us. If these relationships are not successful, we may be unable to develop new products or product enhancements in a timely manner, which could result in a loss of market share, a decrease in revenue or negatively impact our operating results.

We rely on third parties to provide services and technology necessary for the operation of our business. Any failure of one or more of our vendors, suppliers or licensors to provide such services or technology could harm our business.

We rely on third-party vendors to provide critical services, including, among other things, services related to accounting, human resources, information technology and network monitoring that we cannot or do not create or provide ourselves. We depend on these vendors to ensure that our corporate infrastructure will consistently meet our business requirements. The ability of these third-party vendors to successfully provide reliable and high-quality services is subject to technical and operational uncertainties that are beyond our control. While we may be entitled to damages if our vendors fail to perform under their agreements with us, our agreements with these vendors limit the amount of damages we may receive. In addition, we do not know whether we will be able to collect on any award of damages or that these damages would be sufficient to cover the actual costs we would incur as a result of any vendor's failure to perform under its agreement with us. Upon expiration or termination of any of our agreements with third-party vendors, we may not be able to replace the services provided to us in a timely manner or on terms and conditions, including service levels and cost, that are favorable to us, and a transition from one vendor to another vendor could subject us to operational delays and inefficiencies until the transition is complete.

Any disruption to the operations of our third-party contractors and their suppliers could cause significant delays in the production or shipment of our products.

Our operations could be harmed if manufacturing, logistics or other operations of our third-party contractors or their suppliers are disrupted for any reason, including natural disasters, high heat events or water shortages, severe storms, other negative impacts from climate change, information technology system failures, military actions or environmental, public health or regulatory issues. The majority of our products are manufactured by or receive components from third-party contractors located in South Korea, Taiwan and Japan. The risk of an earthquake or tsunami in South Korea, Taiwan, Japan and elsewhere in the Pacific Rim region is significant due to the proximity of major earthquake fault lines. A disruption in the availability of image sensors from Sony Corporation as a result of the 2016 Kumamoto, Japan earthquake impacted our customers' ability to build or launch cameras and, as a result, negatively impacted the timing and scope of demand for our SoCs in fiscal year 2017. Similarly, a severe cold storm in Texas in February 2021 disrupted the manufacturing of some of our products at Samsung's Texas facility for several weeks. Any disruption resulting from such events could cause significant delays in the production or shipment of our products until we are able to shift our manufacturing, assembling or testing from the affected contractor to another third-party vendor. We may not be able to obtain alternate capacity on favorable terms, or at all.

Risks Related to Our Legal and Regulatory Environment

Global economic and political conditions, including high inflation, recessionary concerns and trade restrictions, may have an impact on our business and financial condition in ways that we currently cannot predict.

Our operations and performance depend significantly on global, regional and U.S. economic and geopolitical conditions. Customer demand for our solutions may be negatively impacted by weak economic conditions, high inflation or recessionary environments in the US and other nations. Inflation or other deteriorations in global economic conditions may impact our operating expenses and third parties may demand pricing accommodations, which could harm our ability to meet customer demands or collect revenue or otherwise harm our business and financial results.

General trade tensions between the United States and China have been escalating, which has, in our view, created and will perpetuate an uncertain business environment. Additionally, the U.S. government announced new controls restricting the ability to send certain products and technology related to semiconductors, semiconductor manufacturing, advanced computing, and supercomputing to China without an export license. In many cases, these licenses are subject to a policy of denial and will not be issued. While our current products are not restricted by these controls, such controls could impact our ability to export products to China in the future. It also is possible that the Chinese government will retaliate in ways that could impact our business.

If additional tariffs or trade restrictions are imposed on our SoC solutions or the products of our customers, or trade restrictions are imposed on our ability to conduct business with certain customers, there could be a negative impact on our operations and financial performance. Even in the absence of new restrictions, tariffs or changes in export classifications, it is possible that foreign customers could take actions to reduce dependence on the supply of components, including our solutions, that could be subject to new export classifications or trade restrictions. There are also risks that the Chinese government may, among other things, require the use of local suppliers, compel companies that do business in China to partner with local companies to conduct business and provide incentives to government-backed local customers to buy from local suppliers. A large portion of our employee base is in China and impacts to our China offices could significantly harm our operations, make it difficult to support customers and negatively impact product development. The materialization of these risks could have a material adverse effect on our business and financial condition. Further, our business and performance are subject to economic conditions, and our suppliers, distributors, and customers may suffer their own financial and economic challenges.

Russia's ongoing conflict with Ukraine has triggered significant sanctions from U.S. and European leaders. Resulting changes in U.S. trade policy could trigger retaliatory actions by Russia, its allies and other affected countries, including China, resulting in a trade war. For example, in addition to controls imposed on China discussed above, following Russia's invasion of Ukraine, the United States and other countries imposed certain economic sanctions and severe export control restrictions against Russia and Belarus, as well as certain Russian nationals, which caused us to terminate certain business relationships in those countries. These sanctions and restrictions have continued to increase as the conflict has further escalated, and the United States and other countries could impose wider sanctions and export restrictions and take other actions in the future that could impact our business. Furthermore, if the conflict between Russia and Ukraine continues for a long period of time, or if other countries, including the U.S., become further involved in the conflict, we could face significant adverse effects to our business and financial condition. In addition, some of our customers and third-party partners have engineering teams located in Russian and/or Ukraine, whose operations have been and may continue to be disrupted by the ongoing conflict between the countries. If such disruption were to continue for an extended period, our customers could face delays in the launch of new products containing our solutions, resulting in delayed or decreased demand for our solutions.

We have significant business operations in Taiwan, including approximately 360 employees, and many of our third-party manufacturing suppliers are located in Taiwan. Accordingly, our business, financial condition and results of operations may be affected by changes in governmental and economic policies in Taiwan, social instability and diplomatic and social developments in or affecting Taiwan due to its international political status. Although significant economic and cultural relations have been established between Taiwan and China, we cannot assure that relations between Taiwan and China will not face political or economic uncertainties in the future. Any deterioration in the relations between Taiwan and China, and other factors affecting military, political or economic conditions in Taiwan, could disrupt our business operations and materially and adversely affect our results of operations.

Our ability to sell our products to several China customers has been restricted.

Several of our customers, including Hangzhou Hikvision Digital Technology Co., Ltd, or Hikvision, Zhejiang Dahua Technology Co., Ltd., or Dahua, and affiliates of Shenzhen Dajiang Baiwang Technology Co., Ltd., have been added to the Entity List of the Bureau of Industry and Security, or BIS, of the U.S. Department of Commerce, or Commerce, which imposes limitations on the supply of certain U.S. items to the listed entities. In October 2022, BIS imposed additional restrictions on transactions with Dahua involving items subject to BIS export regulations. These export regulations negatively impact our ability to ship items subject to BIS regulations to these listed entities. Notwithstanding our ability to continue to supply some SoC products to some affiliates of the listed entities, these customers may seek to obtain similar or substitute products from our competitors that are not subject to these limitations, or to develop similar or substitute products themselves. We also cannot be certain what additional actions the U.S. government may take with respect to any of our China customers, including changes to the Entity List restrictions, export regulations, tariffs or other trade restrictions, or whether the Chinese government may take any actions in response to U.S. government action that may adversely affect our ability to do business with our China customers. Even in the absence of new restrictions, tariffs or trade actions imposed by the U.S. or Chinese government, our China customers may take actions to reduce dependence on the supply of components subject to U.S. trade regulations, including our SoC solutions, which could have a material adverse effect on our operating results. We are unable to predict the duration of the restrictions imposed by the U.S. government or of any additional governmental actions, any of which could have a long-term adverse effect on our business, operating results and financial condition.

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

The U.S. and various foreign governments have imposed controls, export license requirements and restrictions on the import or export of certain products, technologies and software. We must export our products in compliance with U.S. export controls, including the Commerce's Export Administration Regulations. We may not always be successful in obtaining necessary export licenses, and our failure to obtain required import or export approval for our products or limitations on our ability to export or sell our products imposed by these laws may harm both our international and domestic sales and adversely affect our revenue. Noncompliance with these laws could have negative consequences, including government investigations, penalties and reputational harm.

Changes in our products or changes in export, import and economic sanctions laws and regulations may delay our introduction of new products in international markets, prevent our customers from deploying our products internationally or, in some cases, prevent the export or import of our products to or from certain countries altogether. Any change 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 result in decreased use of our products by, or in our decreased ability to export or sell our products to, existing or potential customers with international operations. In such event, our business and results of operations could be adversely affected.

We are subject to warranty and product liability claims and to product recalls.

From time to time, we are subject to warranty claims that may require us to make significant expenditures to defend these claims or pay damage awards. In the future, we may also be subject to product liability claims resulting from failure of our solutions or if products we design, manufacture, or sell, cause personal injury or property damage, even where the cause is unrelated to product defects. These risks will likely increase as our products are introduced into new devices, markets, or applications, including autonomous and semi-autonomous automotive, drone and robotic applications. In the event of a warranty claim, we may also incur costs if we compensate the affected customer. We maintain product liability insurance, but this insurance is limited in amount and subject to significant deductibles. There is no guarantee that our insurance will be available or adequate to protect against all claims. We also may incur costs and expenses relating to a recall of one of our customers' products containing one of our devices. The process of identifying a recalled product in consumer devices that have been widely distributed may be lengthy and require significant resources, and we may incur significant replacement costs, contract damage claims from our customers and reputational harm. Costs or payments made in connection with warranty and product liability claims and product recalls could harm our financial condition and results of operations, as well as harm our reputation and cause the market value of our ordinary shares to decline.

We are subject to governmental laws, regulations and other legal obligations related to privacy, data protection and cybersecurity.

The legislative and regulatory framework for privacy, data protection and cybersecurity issues worldwide is rapidly evolving and is likely to remain uncertain for the foreseeable future. We collect and otherwise process personal information and other data as part of our business processes and activities. This data is subject to a variety of U.S. and international laws and regulations, including oversight by various regulatory or other governmental bodies. Many foreign countries and governmental bodies, including China, the European Union and other relevant jurisdictions where we conduct business, have laws and regulations concerning the collection, use and other processing of personal information and other data obtained from their residents or by businesses operating within their jurisdictions that are more restrictive than those in the U.S. For example, the European Union has adopted the General Data Protection Regulation, or GDPR, which imposed stringent data protection requirements and provided for substantial penalties for noncompliance, including the potential for fines of up to €20 million or 4% of the annual global revenues of the noncompliant entity, whichever is greater. The United Kingdom has adopted legislation that substantially implements the GDPR and provides for a similar penalty structure. Similarly, California has adopted the California Consumer Privacy Act of 2018, or CCPA, which took effect in 2020. California has adopted a new law, the California Privacy Rights Act of 2020, or CPRA, that substantially expanded the CCPA as of January 1, 2023. The CCPA, as amended and modified by the CPRA, gives California residents the right to access, delete and opt out of certain sharing of their information, and imposes penalties for failure to comply. Other U.S. states have proposed, and in certain cases enacted, similar general privacy legislation.

In 2021, the National People's Congress passed the Data Security Law of the People's Republic of China (Data Security Law) and China's Personal Information Protection Law (PIPL). The Data Security Law is the first comprehensive data security legislation in China and aims to regulate a wide range of issues in relation to the collection, storage, processing, use, provision, transaction and publication of any kind of data. The PIPL is the first national-level law comprehensively regulating issues in relation to personal information protection in China. Significant uncertainty remains regarding how regulators will interpret and enforce these laws, but the Data Security Law contains provisions that allow substantial government oversight and include fines for failure to obtain required approval from China's cyber and data protection regulators for cross-border personal information-related data transfers. PIPL authorizes enforcement by cybersecurity authorities and other regulators, and provides for fines and other remedies for noncompliance.

Aspects of these laws remain unclear, resulting in further uncertainty and potentially requiring us to modify our data practices and policies and to incur substantial additional costs and expenses in an effort to comply. Because the interpretation and application of many laws and regulations relating to privacy, data protection, and data security, along with industry standards, are uncertain, it is possible that these laws and regulations may be interpreted and applied in a manner that is inconsistent with our data management practices or the features of our products or solutions, and we could face fines, lawsuits, regulatory investigations, and other claims and penalties, and we could be required to fundamentally change our products or our business practices, which could have an adverse effect on our business. Any inability, or perceived inability, to adequately address privacy and data protection concerns, or to comply with applicable laws, regulations, policies, industry standards, contractual obligations or other legal obligations, even if unfounded, could result in additional cost and liability to us, inhibit sales, damage our reputation and adversely affect our business.

Failure to comply with the U.S. Foreign Corrupt Practices Act, or FCPA, and similar laws associated with our activities outside of the United States could subject us to penalties and other adverse consequences.

We face significant risks if we fail to comply with the FCPA and other anti-corruption laws that prohibit improper payments or offers of payment to foreign governments and political parties by us for the purpose of obtaining or retaining business. In many foreign countries, particularly in countries with developing economies, it may be a local custom that businesses operating in such countries engage in business practices that are prohibited by the FCPA or other applicable laws and regulations. Although we implemented an FCPA compliance program, we cannot assure you that all of our employees and agents, as well as those companies to which we outsource certain of our business operations, will not take actions in violation of our policies and applicable law, for which we may be ultimately held responsible. Any violation of the FCPA or other applicable anti-corruption laws could result in severe criminal or civil sanctions and, in the case of the FCPA, suspension or debarment from U.S. government contracting, which could have a material and adverse effect on our reputation, business, financial condition, operating results and cash flows.

We, our customers and third-party contractors are subject to increasingly complex environmental regulations and compliance with these regulations may delay or interrupt our operations and adversely affect our business.

We face increasing complexity in our procurement, design, and research and development operations as a result of requirements relating to the materials composition of our products, including the European Union's, or EU's, Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, or RoHS, directive, which restricts the content of lead and certain other hazardous substances in specified electronic products put on the market in the EU and similar Chinese legislation relating to marking of electronic products which became effective in March 2007. Failure to comply with these and similar laws and regulations could subject us to fines, penalties, civil or criminal sanctions, contract damage claims, and take-back of non-compliant products, which could harm our business, reputation and operating results. The passage of similar requirements in additional jurisdictions or the tightening of these standards in jurisdictions where our products are already subject to such requirements could cause us to incur significant expenditures to make our products compliant with new requirements, or could limit the markets into which we may sell our products.

Our failure to comply with present and future environmental, health and safety laws could cause us to incur substantial costs, result in civil or criminal fines and penalties and decreased revenue, which could adversely affect our operating results. Failure by our foundry vendors or other suppliers to comply with applicable environmental laws and requirements could cause disruptions and delays in our product shipments, which could adversely affect our relations with our ODMs and OEMs and adversely affect our business and results of operations.

Regulations related to “conflict minerals” may force us to incur additional expenses, may make our supply chain more complex and may result in damage to our reputation with customers.

Pursuant to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, or the Dodd-Frank Act, the Securities and Exchange Commission, or the SEC, has adopted requirements for companies that use certain minerals and metals, known as conflict minerals, in their products, whether or not these products are manufactured by third parties. These requirements require companies to perform due diligence, disclose and report whether or not such minerals originate from the Democratic Republic of the Congo and adjoining countries. These requirements could adversely affect the sourcing, availability and pricing of minerals used in the manufacture of semiconductor devices, including our products. While these requirements continue to be subject to administrative uncertainty, we have incurred, and may continue to incur, costs to comply with the disclosure requirements, including costs related to determining the source of any of the relevant minerals and metals used in our products. Since our supply chain is complex, we may not be able to sufficiently verify the origins for these minerals and metals used in our products through the due diligence procedures that we implement, which may harm our reputation. In such event, we may also face difficulties in satisfying customers who require that all of the components of our products are certified as conflict mineral free.

We are subject to regulatory compliance requirements, including Section 404 of the Sarbanes-Oxley Act of 2002, which are costly to comply with, and our failure to comply with these requirements could harm our business and operating results.

We are subject to disclosure and compliance requirements associated with being a public company, including but not limited to compliance with Section 404 of the Sarbanes-Oxley Act of 2002. For example, Section 404 of the Sarbanes-Oxley Act requires that our management report on, and our independent auditors attest to, the effectiveness of our internal control structure and procedures for financial reporting. Compliance with Section 404 requires a significant amount of time, expenses and diversion of internal resources. If we or our auditors discover a material weakness in our internal controls, the disclosure of that fact, even if quickly remedied, could reduce the market’s confidence in our financial statements and harm our stock price. In addition, if we fail to maintain effective controls over financial reporting, we could be subject to sanctions or investigations by The NASDAQ Stock Market, the SEC, or other regulatory authorities. Irrespective of compliance with Section 404, any failure of our internal controls could have a material adverse effect on our stated results of operations and harm our reputation. Furthermore, investor perceptions of our company may suffer, and this could cause a decline in the market price of our ordinary shares.

Changes in effective tax rates or adverse outcomes resulting from examination of our income tax returns could adversely affect our results.

Our future effective tax rates could be adversely affected if our earnings are lower than anticipated in countries where we have lower statutory rates and higher than anticipated in countries where we have higher statutory rates, by changes in the valuation of our deferred tax assets and liabilities, transfer pricing adjustments, re-organization or restructuring of our businesses, changes in our corporate structure, including the effect of acquisitions on our legal structure, by tax costs related to intercompany realignments, tax effects of share-based compensation, expiration of or lapses in tax incentives, or by changes in tax laws, regulations, accounting principles or interpretations thereof. For example, changes in tax laws, including the U.S. federal tax legislation commonly referred to as the Tax Cuts and Jobs Act of 2017, or Tax Act, 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. The Tax Act requires complex computations not previously provided in U.S. tax law. The U.S. Department of Treasury has broad authority to issue regulations and interpretative guidance that may significantly impact how we will apply the law and impact our results of operations in the period issued. In August 2022, the U.S. enacted the Inflation Reduction Act of 2022 (IRA) which includes a new 15% corporate minimum tax as well as a 1% excise tax on the fair value of corporate stock repurchases made by U.S. corporations and certain foreign corporations after December 31, 2022. We do not expect the IRA to have a material impact on our financial statements.

In addition, our income tax returns are subject to continuous examination by the Internal Revenue Service, or IRS, and other tax authorities. We regularly assess the likelihood of adverse outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. We cannot assure you that the outcomes from these continuous examinations will not have an adverse effect on our operating results and financial condition.

Unfavorable tax law changes, an unfavorable governmental review of our tax returns, changes in our geographical earnings mix or imposition of withholding taxes on repatriated earnings could adversely affect our effective tax rate and our operating results.

Our operations are subject to certain taxes, such as income and transaction taxes, in the Cayman Islands, the United States, China, Hong Kong, Japan, Italy, Germany, South Korea, Taiwan and other jurisdictions in which we do business. A change in the tax laws in the jurisdictions in which we do business, including an increase in tax rates or an adverse change in the treatment of an item of income or expense, possibly with retroactive effect, could result in a material increase in the amount of taxes we incur. In particular, past proposals have been made to change certain U.S. tax laws relating to foreign entities with U.S. connections, which may include us. For example, previously proposed legislation has considered treating certain foreign corporations as U.S. domestic corporations (and therefore taxable on all of their worldwide income) if the management and control of the foreign corporation occurs, directly or indirectly, primarily within the United States. If such legislation were enacted, we could, depending on the precise form, be subject to U.S. taxation notwithstanding our domicile outside the United States. In addition, over the last several years, the Organization for Economic Co-operation and Development (OECD) has been working on a Base Erosion and Profit Shifting Project and has been issuing guidelines and proposals covering a number of issues, including country-by-country reporting, permanent establishment rules, transfer pricing rules and tax treaties. Many of these changes have been or are in the process of being adopted by numerous countries and could materially and adversely affect our provision for income taxes. In 2021, more than 140 countries tentatively signed on to a framework that imposes a global minimum tax of 15%. The Council of the European Union has adopted this initiative for enactment by European Union member states by December 31, 2023, with implementation into the domestic laws of those states by the end of 2023, with the rules to be applicable for fiscal years starting on or after December 31, 2023 for multinationals that meet the annual threshold of at least EUR 750 million of consolidated revenues. Additional changes to global tax laws are likely to occur, and such changes may adversely affect our effective tax rate, operating results, and cash flow.

In December 2018, the Cayman Islands passed the International Tax Co-Operation (Economic Substance) Law, 2018, which requires Cayman Islands companies carrying on one or more relevant activities to maintain a substantial economic presence in the Cayman Islands. Effective from December 31, 2019, we have structured our activities to comply with the new law. However, the legislation remains subject to further clarification and interpretation and accordingly, there is no guarantee that we will be deemed to be compliant. Furthermore, this legislation may require us to make additional changes to the activities we carry on in the Cayman Islands, which could increase our cost of operations, and we could be subject to penalties for lack of compliance. As a result, we are not able to determine the impact on our operations and net income as of the current period.

We are subject to periodic audits or other reviews by tax authorities in the jurisdictions in which we conduct our activities. Any such audit, examination or review requires management's time, diverts internal resources and, in the event of an unfavorable outcome, may result in additional tax liabilities or other adjustments to our historical results.

Because we conduct operations in multiple jurisdictions, our effective tax rate is influenced by the amounts of income and expense attributed to each such jurisdiction. If such amounts were to change so as to increase the amounts of our net income subject to taxation in higher-tax jurisdictions, or if we were to commence operations in jurisdictions assessing relatively higher tax rates, our effective tax rate could be adversely affected. In addition, we may determine that it is advisable from time to time to repatriate earnings from subsidiaries under circumstances that could give rise to imposition of potentially significant withholding taxes by the jurisdictions in which such amounts were earned, without our receiving the benefit of any offsetting tax credits, which could also adversely impact our effective tax rate.

We may be classified as a passive foreign investment company which could result in adverse U.S. federal income tax consequences for U.S. holders of our ordinary shares.

Based on the current and anticipated valuation of our assets and the composition of our income and assets, we do not expect to be considered a passive foreign investment company, or PFIC, for U.S. federal income tax purposes for our 2023 fiscal year or the foreseeable future. However, a separate determination must be made at the close of each taxable year as to whether we are a PFIC for that taxable year, and we cannot assure you that we will not be a PFIC for our 2024 fiscal year or any future taxable year. Under current law, a non-U.S. corporation will be considered a PFIC for any taxable year if either (a) at least 75% of its gross income is passive income or (b) at least 50% of the value of its assets, generally based on an average of the quarterly values of the assets during a taxable year, is attributable to assets that produce or are held for the production of passive income. PFIC status depends on the composition of our assets and income and the value of our assets (which may be based in part on the value of our ordinary shares which may fluctuate), including, among others, a pro rata portion of the income and assets of each subsidiary in which we own, directly or indirectly, at least 25% by value of the subsidiary's equity interests, from time to time. Because we currently hold, and expect to continue to hold, a substantial amount of cash or cash equivalents, and because the calculation of the value of our assets may be based in part on the value of our ordinary shares which may fluctuate and may fluctuate considerably given that market prices of technology companies historically often have been volatile, we may be a PFIC for any taxable year. If we were treated as a PFIC for any taxable year during which a U.S. holder held ordinary shares, certain adverse U.S. federal income tax consequences could apply for such U.S. holder.

Changes in our United States federal income tax classification, or that of our subsidiaries, could result in adverse tax consequences to our 10% or greater U.S. shareholders.

The Tax Act may have changed the consequences to U.S. shareholders that own, or are considered to own, as a result of the attribution rules, 10% or more of the voting power or value of the stock of a non-U.S. corporation (a 10% U.S. shareholder) under the U.S. federal income tax law applicable to owners of U.S. controlled foreign corporations, or CFCs.

Prior to the Tax Act, we did not believe that we, or any of our non-U.S. subsidiaries, were considered a CFC, which is a determination made daily based on whether the 10% U.S. shareholders together own, or are considered to own under the attribution rules, more than 50% of the voting power or value of a non-U.S. corporation. Under the Tax Act, however, because our group includes one or more U.S. subsidiaries, certain of our non-U.S. subsidiaries may be classified as CFCs with respect to any single 10% U.S. shareholder, even without regard to whether 10% U.S. shareholders together own, directly or indirectly, more than 50% of the voting power or value of the Company. Our 10% or greater U.S. shareholders should consult their individual tax advisors for advice regarding the 2017 Act revision to the U.S. federal income tax law applicable to owners of CFCs.

Risks Related to Our Intellectual Property

Our failure to adequately protect our intellectual property rights could impair our ability to compete effectively or defend ourselves from litigation, which could harm our business, financial condition and results of operations.

Our success depends, in part, on our ability to protect our intellectual property. We rely primarily on patent, copyright, trademark and trade secret laws, as well as confidentiality and non-disclosure agreements and other contractual protections, to protect our proprietary technologies and know-how, all of which offer only limited protection. The steps we have taken to protect our intellectual property rights may not be adequate to prevent misappropriation of our proprietary information or infringement of our intellectual property rights, and our ability to prevent such misappropriation or infringement is uncertain, particularly in countries outside of the United States. The failure of our patents to adequately protect our technology might make it easier for our competitors to offer similar products or technologies, which would harm our business. For example, our patents and patent applications could be opposed, contested, circumvented, designed around by our competitors or be declared invalid or unenforceable in judicial or administrative proceedings. Our foreign patent protection is generally not as comprehensive as our U.S. patent protection and may not protect our intellectual property in some countries where our products are sold or may be sold in the future. Many U.S.-based companies have encountered substantial intellectual property infringement in foreign countries, including countries where we sell products. Even if foreign patents are granted, effective enforcement in foreign countries may not be available. For example, the legal environment relating to intellectual property protection in certain emerging market countries where we operate is relatively weaker, often making it difficult to create and enforce such rights. We may not be able to effectively protect our intellectual property rights in these emerging markets or elsewhere. If such an impermissible use of our intellectual property or trade secrets were to occur, our ability to sell our solutions at competitive prices may be adversely affected and our business, financial condition, operating results and cash flows could be materially and adversely affected.

We may in the future need to initiate infringement claims or litigation in order to try to protect our intellectual property rights. Litigation, whether we are a plaintiff or a defendant, can be expensive, time-consuming and may divert the efforts of our technical staff and management, which could harm our business, whether or not such litigation results in a determination favorable to us. Litigation also puts our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not being issued. Additionally, any enforcement of our patents or other intellectual property may provoke third parties to assert counterclaims against us. If we are unable to protect our proprietary rights or if third parties independently develop or gain access to our or similar technologies, our business, revenue, reputation and competitive position could be harmed.

Third parties' assertions of infringement of their intellectual property rights could result in our having to incur significant costs and cause our operating results to suffer.

The semiconductor industry is characterized by vigorous protection and pursuit of intellectual property rights and positions, which has resulted in protracted and expensive litigation for many companies. We and certain of our customers have received, and in the future may receive, communications from others alleging our infringement of their patents, trade secrets or other intellectual property rights. In addition, we and certain of our end customers have been the subject of lawsuits alleging infringement of intellectual property rights by our solutions or products incorporating our solutions, including the assertion that the alleged infringement may be attributable, at least in part, to our technology. Such lawsuits could subject us to significant liability for damages and invalidate our proprietary rights, though this has not occurred to date. Any potential intellectual property litigation also could force us to do one or more of the following:

- stop selling products or using technology that contain the allegedly infringing intellectual property;
- incur significant legal expenses;
- pay substantial damages to the party whose intellectual property rights we may be found to be infringing;
- redesign those products that contain the allegedly infringing intellectual property;
- attempt to obtain a license to the relevant intellectual property from third parties, which may not be available on reasonable terms or at all; or
- lose the opportunity to license our technology to others or to collect royalty payments based upon successful protection and assertion of our intellectual property against others.

Any significant impairment of our intellectual property rights from any litigation we face could harm our business and our ability to compete.

Any potential dispute involving our patents or other intellectual property could affect our customers, which could trigger our indemnification obligations to them and result in substantial expense to us.

In any potential dispute involving our patents or other intellectual property, our customers could also become the target of litigation. Certain of our customers have received notices from third parties claiming to have patent rights in certain technology and inviting our customers to license this technology, and certain of our end customers have been the subject of lawsuits alleging infringement of patents by products incorporating our solutions, including the assertion that the alleged infringement may be attributable, at least in part, to our technology. Because we generally indemnify our customers for intellectual property claims made against them for products incorporating our technology, any litigation could trigger technical support and indemnification obligations under some of our license agreements, which could result in substantial expense to us. Because some of our ODMs and OEMs are larger than we are and have greater resources than we do, they may be more likely to be the target of an infringement claim by third parties than we would be, which could increase our chances of becoming involved in a future lawsuit. If any such claims were to succeed, we might be forced to pay damages on behalf of our ODMs or OEMs that could increase our expenses, disrupt our ability to sell our solutions and reduce our revenue. In addition to the time and expense required for us to supply support or indemnification to our customers, any such litigation could severely disrupt or shut down the business of our customers, which in turn could hurt our relations with our customers and cause the sale of our products to decrease.

The use of open source software in our products, processes and technology may expose us to additional risks and compromise our proprietary intellectual property.

Our products, processes and technology sometimes utilize and incorporate software that is subject to an open source license. Open source software is typically freely accessible, usable and modifiable. Certain open source software licenses, such as the GNU General Public License, 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 source code to the user's software. In addition, certain open source software licenses require the user of such software to make any derivative works of the open source code available to others on terms unfavorable to us or at no cost. This can subject previously proprietary software to open source license terms.

While we monitor the use of open source software in our products, processes and technology and try to ensure that no open source software is used in such a way as to require us to disclose the source code to the related product, processes or technology when we do not wish to do so, such use could inadvertently occur. Additionally, if a third-party software provider has incorporated certain types of open source software into software we license from such third-party for our products, processes or technology, we could, under certain circumstances, be required to disclose the source code to our products, processes or technology. This could harm our intellectual property position and our business, results of operations and financial condition.

Risks Related to Ownership of Our Ordinary Shares

The market price of our ordinary shares may be volatile, which could cause the value of your investment to decline.

The market price of our ordinary shares has historically been highly volatile, and has been particularly volatile in recent years. For example, since February 1, 2020, the trading price of our common stock ranged from a low of \$36.02 to a high of \$227.59 and was \$89.84 at the close of trading on January 31, 2023. The trading price of our ordinary shares is likely to remain volatile and could be subject to wide fluctuations in price in response to various factors, some of which are beyond our control. These factors include:

- changes in financial estimates, including our ability to meet our future revenue and operating profit or loss projections;
- fluctuations in our operating results or those of other semiconductor or comparable companies;
- fluctuations in the economic performance or market valuations of companies perceived by investors to be comparable to us;
- economic developments in the semiconductor industry as a whole;
- general economic conditions, including conditions related to the banking industry or caused by pandemics and high inflation, and slow or negative market growth;
- trade and other geopolitical activities affecting markets we address;
- announcements by us or our competitors of acquisitions, new products, significant contracts or orders, commercial relationships or capital commitments;
- our ability to develop and market new and enhanced solutions on a timely basis;

- changes in the demand for our customers' products;
- commencement of or our involvement in litigation;
- disruption to our operations;
- any major change in our board of directors or management;
- political or social conditions in the markets where we sell our products;
- changes in governmental regulations; and
- changes in earnings estimates or recommendations by securities analysts.

In addition, the stock market in general, and the market for semiconductor and other technology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. These broad market and industry factors may cause the market price of our ordinary shares to decrease, regardless of our actual operating performance. These trading price fluctuations may also make it more difficult for us to use our ordinary shares as a means to make acquisitions or to use options to purchase our ordinary shares to attract and retain employees. If the market price of our ordinary shares declines, you may not realize any return on your investment in us and may lose some or all of your investment. In addition, in the past, following periods of volatility in the overall market and the market price of a company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Our actual operating results may not meet or exceed our guidance and investor expectations, which would likely cause our stock price to decline.

From time to time, we may release guidance in our earnings releases, earnings conference calls or otherwise, regarding our future performance that represent our management's estimates as of the date of release. If given, this guidance, which will include forward-looking statements, will be based on projections prepared by our management. Projections are based upon a number of assumptions and estimates that, while presented with numerical specificity, are inherently subject to significant business, economic and competitive uncertainties and contingencies, many of which are beyond our control. The principal reason that we expect to release guidance is to provide a basis for our management to discuss our business outlook with analysts and investors. With or without our guidance, analysts and other investors may publish expectations regarding our business, financial performance and results of operations. We do not accept any responsibility for any projections or reports published by any such third persons.

Guidance is necessarily speculative in nature, and it can be expected that some or all of the assumptions of the guidance furnished by us will not materialize or will vary significantly from actual results. If our actual performance does not meet or exceed our guidance or investor expectations, the trading price of our ordinary shares is likely to decline. Similarly, if our guidance does not meet or exceed expectations of investors or securities analysts, the trading price of our ordinary shares is likely to decline.

The price of our ordinary shares could decrease as a result of shares being sold in the market.

Sales of a substantial number of our ordinary shares in the public market, or the perception that these sales might occur, could cause the market price of our ordinary shares to decline. In the past, we have issued stock options to employees and we regularly issue restricted stock units (RSUs) to employees, which settle as ordinary shares upon vesting. These shares can be freely sold in the public market upon issuance and vesting, subject to restrictions provided under the terms of the applicable plan and/or the option agreements entered into with option holders. We may also issue ordinary shares or securities convertible into ordinary shares from time to time in connection with a financing, acquisition or otherwise. Any such issuance could result in substantial dilution to our existing shareholders and cause the trading price of our stock to decline.

We do not intend to pay dividends on our ordinary shares and, consequently, a shareholder's ability to achieve a return on its investment will depend on appreciation in the price of our ordinary shares.

We have never declared or paid any cash dividends on our ordinary shares and do not currently intend to do so for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. Therefore, shareholders are not likely to receive any dividends on their ordinary shares for the foreseeable future and the success of an investment in our ordinary shares will depend upon any future appreciation in their value. There is no guarantee that our ordinary shares will appreciate in value or even maintain the price at which our shareholders have purchased their shares. Investors seeking cash dividends should not purchase our ordinary shares.

Provisions of our memorandum and articles of association and Cayman Islands corporate law may discourage or prevent an acquisition of us which could adversely affect the value of our ordinary shares.

Provisions of our memorandum and articles of association and Cayman Islands law may have the effect of delaying or preventing a change of control or changes in our management. These provisions include the following:

- the division of our board of directors into three classes;
- the right of our board of directors to elect a director to fill a vacancy created by the expansion of our board of directors or due to the resignation or departure of an existing board member;
- prohibition of cumulative voting in the election of directors which would otherwise allow less than a majority of shareholders to elect director candidates;
- the requirement for the advance notice of nominations for election to our board of directors or for proposing matters that can be acted upon at a shareholders' meeting;
- the ability of our board of directors to issue, without shareholder approval, such amounts of preference shares as the board of directors deems necessary and appropriate with terms set by our board of directors, which rights could be senior to those of our ordinary shares;
- the elimination of the rights of shareholders to call a special meeting of shareholders and to take action by written consent in lieu of a meeting; and
- the required approval of a special resolution of the shareholders, being a two-thirds vote of shares held by shareholders present and voting at a shareholder meeting, to alter or amend the provisions of our post-offering memorandum and articles of association.

Holders of our ordinary shares may face difficulties in protecting their interests because we are incorporated under Cayman Islands law.

Our corporate affairs are governed by our amended and restated memorandum and articles of association, by the Companies Law (as the same may be supplemented or amended from time to time) of the Cayman Islands and by the common law of the Cayman Islands. The rights of our shareholders and the fiduciary responsibilities of our directors under Cayman Islands law are not as clearly established as under statutes or judicial precedent in existence in jurisdictions in the United States. In particular, the Cayman Islands has a less developed body of securities laws than the United States and provides significantly less protection to investors. There is no legislation specifically dedicated to the rights of investors in securities and thus no statutorily defined private cause of action specific to investors such as those provided under the Securities Act or the Securities Exchange Act of 1934, as amended. In addition, shareholders of Cayman Islands companies may not have standing to initiate shareholder derivative actions in U.S. federal courts. Therefore, you may have more difficulty in protecting your interests in the face of actions by our management, directors or controlling shareholders than would shareholders of a corporation incorporated in a jurisdiction in the United States due to the comparatively less developed nature of Cayman Islands law in this area.

Shareholders of Cayman Islands exempted companies, such as our company, have no general rights under Cayman Islands law to inspect corporate records and accounts or to obtain copies of lists of shareholders of the company. Our directors have discretion under our articles of association to determine whether or not, and under what conditions, our corporate records may be inspected by our shareholders, but are not obliged to make them available to our shareholders. This may make it more difficult for you to obtain the information needed to establish any facts necessary for a shareholder motion or to solicit proxies from other shareholders in connection with a proxy contest.

Subject to limited exceptions, under Cayman Islands law, a minority shareholder may not bring a derivative action against the board of directors.

Holders of our ordinary shares may have difficulty obtaining or enforcing a judgment against us because we are incorporated under the laws of the Cayman Islands.

It may be difficult or impossible for you to bring an action against us in the Cayman Islands if you believe your rights have been infringed under U.S. securities laws. There is no statutory recognition in the Cayman Islands of judgments obtained in the United States, although the courts of the Cayman Islands will in certain circumstances recognize and enforce a non-penal judgment of a foreign court of competent jurisdiction without retrial on the merits. While there is no binding authority on this point, this is likely to include, in certain circumstances, a non-penal judgment of a United States court imposing a monetary award based on the civil liability provisions of the U.S. federal securities laws. The Grand Court of the Cayman Islands may stay proceedings if concurrent proceedings are being brought elsewhere. There is uncertainty as to whether the Grand Court of the Cayman Islands would recognize or enforce judgments of United States courts obtained against us predicated upon the civil liability provisions of the securities laws of the United States or any state thereof and whether the Grand Court of the Cayman Islands would hear original actions brought in the Cayman Islands against us predicated upon the securities laws of the United States or any state thereof.

General Risk Factors

If our operations are interrupted, our business and reputation could suffer.

Our operations and those of our manufacturers are vulnerable to interruption caused by technical breakdowns, computer hardware and software malfunctions, software viruses, infrastructure failures, pandemics, including the COVID-19 pandemic and regional health issues, earthquakes, fires, severe storms, floods and other negative impacts from climate change, power losses, telecommunications failures, terrorist attacks, wars, Internet failures and other events beyond our control. Our operations could also be disrupted by geopolitical conditions, particularly in Taiwan or China, where the majority of our employees are located. Any disruption in our services or operations could result in a reduction in revenue, delay product development and R&D, or result in a claim for substantial damages against us, regardless of whether we are responsible for that failure. If remote or work from home conditions were to continue for an extended period of time, we may experience delays in product development, a decreased ability to support our customers, reduced design win activity, and overall lack of productivity. We rely on our computer equipment, database storage facilities and other office equipment, which are located primarily in the seismically active San Francisco Bay Area and Taiwan. If we suffer a significant database or network facility outage, our business could experience disruption until we fully implement our back-up systems.

If securities analysts or industry analysts downgrade our ordinary shares, publish negative research or reports or fail to publish reports about our business, our stock price and trading volume could decline.

The trading market for our ordinary shares will be influenced by the research and reports that industry or securities analysts publish about us, our business and our market. If one or more analysts adversely changes their recommendation regarding our stock or our competitors' stock, our stock price would likely decline. If one or more analysts cease coverage of us or fail to regularly publish reports on us, we could lose visibility in the financial markets which in turn could cause our stock price or trading volume to decline.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our corporate headquarters are located in Santa Clara, California. These facilities accommodate our sales, marketing, research and development, finance, and administration activities. Outside of Santa Clara, California, we lease some facilities in other U.S. locations that are used for research and development and marketing activities. Outside of the United States, we also lease facilities in various international locations that are used for research and development, sales, business development, operations and administrative support. These international facilities are mainly located in Taiwan, China and Italy. Our lease obligations primarily consist of operating leases with lease periods expiring between fiscal years 2024 to 2028.

We believe that our existing facilities are well maintained and in good operating condition, and are sufficient for our needs for the foreseeable future. The following table lists our major locations and primary usage as of January 31, 2023:

Major Locations	Approximate Square Footage	Usage
United States:		
Santa Clara, California	61,700	Corporate Headquarters; Sales; Marketing; Research and Development; Finance; Administration
Wixom, Michigan	2,700	Business Development
Beavercreek, Ohio	16,000	Research and Development
Asia Pacific:		
Hsinchu, Taiwan	85,700	Research and Development; Business Development; Operations; Administration
Shanghai, China	31,600	Research and Development; Business Development
Shenzhen, China	19,200	Research and Development; Business Development
Kowloon, Hong Kong	9,000	Sales; Warehousing
Shin-Yokohama, Japan	1,300	Business Development
SeongNam, South Korea	1,500	Business Development
Europe:		
Parma, Italy	12,100	Research and Development

ITEM 3. LEGAL PROCEEDINGS

We are not engaged in any material legal proceedings at this time. However, from time to time, we may be subject to commercial disputes, employment issues, intellectual property claims and litigation, in the ordinary course of our business. Refer to Note 15, Commitments and Contingencies within Notes to Consolidated Financial Statements for further information.

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

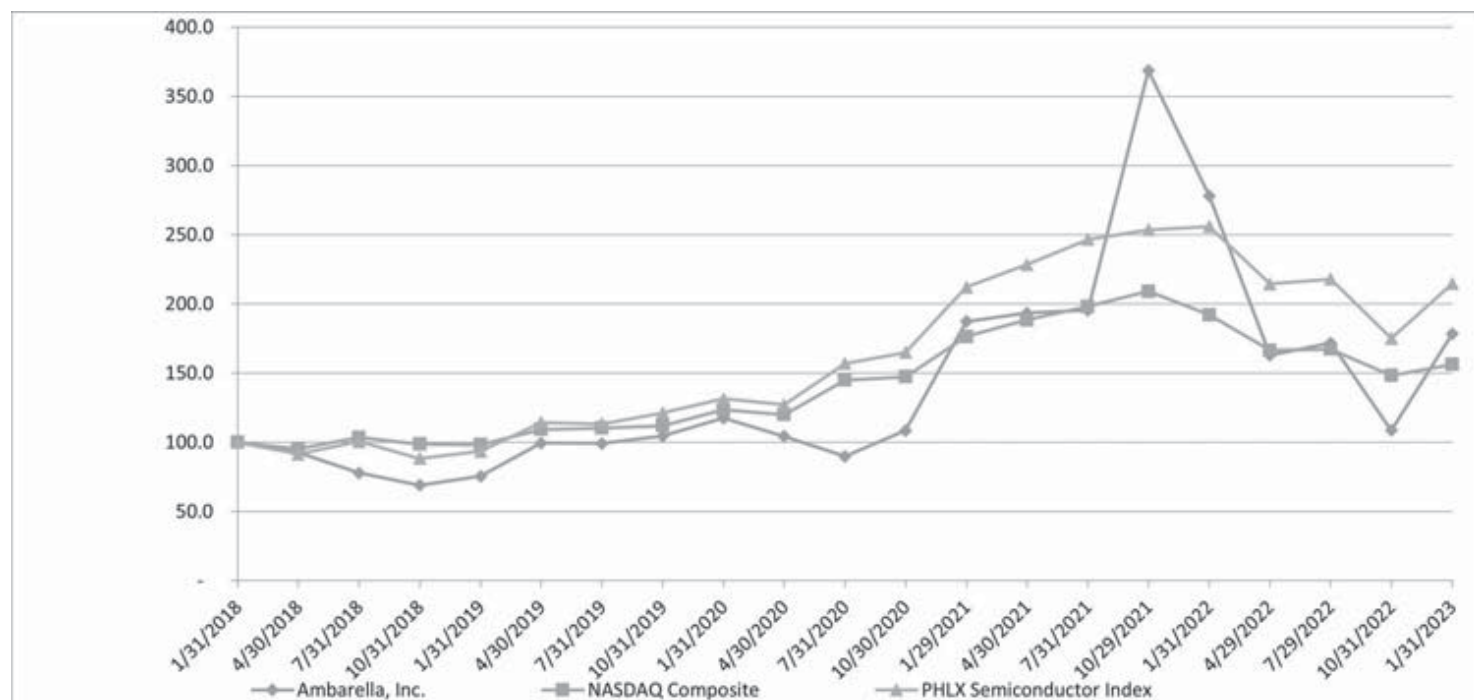
Our ordinary shares are traded on the NASDAQ Global Market under the symbol “AMBA”. On March 24, 2023, there were 29 shareholders of record holding our ordinary shares. We cannot estimate the number of beneficial owners since many brokers and other institutions hold our shares on behalf of shareholders.

Share Performance Graph

This performance graph shall not be deemed to be “soliciting material” or “filed” or incorporated by reference in future filings with the Securities and Exchange Commission, or subject to the liabilities of Section 18 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

The following graph shows a comparison from February 1, 2018 through January 31, 2023 of the cumulative total return for our ordinary shares, the NASDAQ Composite Index and the Philadelphia Semiconductor Index. The comparisons in the graph are historical and are not intended to forecast or be indicative of possible future performance of our ordinary shares.

Comparison of 5 year Cumulative Total Return



Dividends

We have never declared or paid any cash dividends on our ordinary shares and do not currently intend to do so in the foreseeable future.

Securities Authorized for Issuance under Equity Compensation Plans

For information about our equity compensation plans, see Note 12, “Employee Benefits and Stock-based Compensation” of the Notes to Consolidated Financial Statements included in this report.

Purchases of Equity Securities by the Issuer

On March 16, 2020, we repurchased a total of 25,719 of our ordinary shares for approximately \$1.0 million in cash under an authorized repurchase program up to \$50.0 million. Our Board of Directors has approved extensions of the repurchase program through June 30, 2023. There were no shares repurchased in fiscal years 2023 and 2022. As of January 31, 2023, there was approximately \$49.0 million available for repurchases through June 30, 2023. Repurchases under the program may be made from time-to-time through open market purchases, 10b5-1 plans or privately negotiated transactions subject to market conditions, applicable legal requirements and other relevant factors. The repurchase program does not obligate us to acquire any particular amount of ordinary shares, and it may be suspended at any time at the company's discretion. Repurchases are funded using working capital and any repurchased shares are recorded as authorized but unissued shares.

Recent Sales of Unregistered Securities

None.

ITEM 6. [RESERVED]

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

Overview

We are a leading developer of low-power system-on-a-chip, or SoC, semiconductors providing powerful artificial intelligence, or AI, processing, advanced image signal processing and high-resolution video compression. Since inception, we have primarily served human viewing applications with video and image processors for enterprise, public infrastructure and home applications, such as internet protocol, or IP, security cameras, sports cameras, wearables, aerial drones, and aftermarket automotive video recorders. Our recent development efforts have focused on creating advanced AI technology that enables edge devices to visually perceive the environment and make decisions based on the data collected from cameras and, most recently, other types of sensors. This category of AI technology is known as computer vision, or CV, and our CV SoCs integrate our state-of-the-art video processor technology together with our deep learning neural network processing technology, which we refer to as CVflow™. The CVflow-architecture supports a variety of CV algorithms, including object detection, classification and tracking, semantic and instance segmentation, image processing, stereo object detection, terrain mapping, and face recognition. CVflow can process other sensor modalities including lidar and radar, and allows customers to differentiate their products by porting their own, or third party, neural networks and/or classical CV algorithms to our CVflow-based SoCs. Our SoC designs fully integrate AI, computer vision functionality, high-definition, or HD, video processing, image processing, audio processing, and system functions onto a single chip, delivering exceptional video and image quality at high compression rates, differentiated functionality and low power consumption. These CV-based technologies are allowing us to address a broader range of markets and applications requiring AI video features, including IP security cameras, a variety of automotive cameras, consumer cameras, and industrial and robotic applications. We anticipate that our CV technology will also enable us to capture more content per electronic system and increase our average selling price.

Our development efforts are focused on SoCs that provide human viewing, computer vision and radar detection functionalities. As a result, we believe that our future revenue growth, if any, will significantly depend upon our ability to expand within camera markets with our AI and computer vision technology, particularly in the Internet of Things, or IoT, markets, as well as emerging markets such as AI-enabled security cameras, AI-based driving applications, including driver monitoring systems, advanced blind spot detection, object detection, and deep learning algorithms for HD mapping solutions, automotive advanced driver assistance systems, or ADAS, applications, and industrial and robotics markets. We expect our research and development expenditures to increase in comparison to prior periods as we devote additional resources to the development of innovative video and image processing solutions with increased functionality, such as AI and CV capabilities, and as we target new markets.

We sell our SoC solutions to leading original design manufacturers, or ODMs, and original equipment manufacturers, or OEMs, globally, and in the automotive market, we also sell to Tier-1 suppliers. We refer to ODMs and Tier-1 automotive suppliers as our customers and OEMs as our end customers, except as otherwise indicated or as the context otherwise requires.

Our sales cycles typically require a significant investment of time and a substantial expenditure of resources before we can realize revenue from the sale of our solutions, if any. Our typical sales cycle consists of a multi-month sales and development process involving our customers' system designers and management and our sales personnel and software engineers. If successful, this process culminates in a customer's decision to use our solutions in its system, which we refer to as a design win. Our sales efforts are typically directed to the OEM of the product that will incorporate our video and image processing solution, but the eventual design and incorporation of our SoC into the product may be handled by an ODM or Tier-1 supplier on behalf of the OEM.

Volume production may begin within 9 to 18 months after a design win, but could be longer in certain markets, depending on the complexity of our customer's product and other factors upon which we may have little or no influence. In general, design cycles will be longer in the OEM automotive and industrial and robotics markets than in the IoT markets. Once our solutions have been incorporated into a customer's design, they are likely to be used for the life cycle of the customer's product. Conversely, a design loss to a competitor will likely preclude any opportunity for future revenue from such customer's product. Even if we obtain a design win and our SoC remains a component through the life cycle of a customer's product, the volume and timing of actual sales of our SoCs to the customer depend upon the production, release and market acceptance of that product, none of which are within our control. An IoT product typically has a life cycle of 6 to 24 months. We anticipate that product lifecycles will typically be longer than 24 months in the OEM automotive and industrial and robotics markets, as new product introductions occur less frequently in these markets.

Fiscal Year 2023 Financial Highlights and Trends

- We recorded revenue of \$337.6 million in fiscal year 2023, an increase of 1.7% as compared to fiscal year 2022. The increase in revenue was primarily due to continued adoption of our CV-based solutions, which have higher average selling prices, and increased non-recurring engineering (NRE) project services, partially offset by lower product unit shipments driven by customer inventory level reductions as a result of improved supply chain lead times across the semiconductor industry.
- We recorded an operating loss of \$74.3 million in fiscal year 2023, as compared to an operating loss of \$29.6 million in fiscal year 2022. The higher operating loss was primarily due to higher operating expenses, partially offset by increased revenue and gross profit. The increased operating expenses primarily related to higher personnel costs, including stock-based compensation, as a result of the acquisition of Oculii Corporation, or Oculii, in late fiscal year 2022 and benefit programs. The increases were also attributable to higher chip tape-out costs due to the timing and number of chips in development and increased engineering-related expenses for supporting automotive, robotic and industrial applications of our CV-based vision and radar solutions. The increased operating expenses were partially offset by decreased acquisition-related costs associated with the acquisition of Oculii in the prior fiscal year.
- We generated cash flows from operating activities of \$44.1 million in fiscal year 2023, as compared to \$38.8 million in fiscal year 2022. The higher cash flows from operating activities were primarily attributable to higher collections of accounts receivable associated with the timing of sales and lower inventory purchases due to customer inventory level reductions as a result of improved supply chain lead times across the semiconductor industry, partially offset by increased net loss adjusted for certain non-cash items and decreased liabilities associated with employee benefit payments and the timing of payments to our suppliers.
- In the second quarter of fiscal year 2023, we resumed our investments in money market funds and debt securities after a full liquidation of our investments to finance the Oculii acquisition in fiscal year 2022. The debt security investment portfolio consists of commercial paper, debt securities of corporations or corporate bonds, asset-backed securities and U.S. government securities. All of the investments are denominated in United States dollars and are reported at a fair value of approximately \$101.2 million with unrealized losses of \$0.5 million in our consolidated balance sheets.

Factors Affecting Our Performance

Impact of Global Supply Shortages on Our Business. Global supply shortages, and uncertainty in customer demand as well as the worldwide economy, in general, have continued as a result of the COVID-19 pandemic, and may be further exacerbated by the impacts of high inflation. Supply chain issues impact our business as they relate to both our suppliers and our customers. With respect to our suppliers, we have in the past experienced supply constraints for certain chips from Samsung Electronics Corporation and we may in the future experience similar issues. With respect to our customers, to the extent customers face supply chain issues with other components needed to pair with our products in order to produce their end products, such customers may delay future orders of our products or hold inventory of our products for longer periods of time. As a result, we may experience increased volatility in our sales and revenues in the near future, primarily owing to uncertainty around demand for semiconductor products, in general. In addition, recently, some customers have indicated they are reducing their inventory levels, as some component lead times contract toward normal levels. This may reduce such customers' demand for our products. The magnitude and duration of such volatility is uncertain and thus its impact on our business cannot be reasonably estimated at this time.

Ability to Capitalize on AI and Computer Vision Trends. We expect that AI and computer vision functionality will become an increasingly important requirement in many of our current and future markets, including IoT, automotive, industrial and robotics markets. As a result, we believe that our ability to develop advanced AI computer vision technology, enable and support customer product development in emerging applications, such as ADAS, advanced blind spot detection, object detection, classification and tracking, people recognition, retail analytics, and machine learning, and gain customer acceptance of our technology platform and solutions will be critical to our future success. Moreover, achieving design wins, particularly for computer vision-centric applications in the IoT, automotive, industrial and robotics markets, is vital to our ability to generate revenue growth. As such, we closely monitor design wins by our customers. However, a design win may not successfully materialize into revenue, and even if it does result in revenue, the amount generated by each design win can vary significantly.

Ability to Develop and Introduce New or Enhanced Solutions. We operate in a dynamic environment characterized by rapidly changing technologies and technological obsolescence. To compete successfully, we must design, develop, market and sell enhanced solutions with increased levels of performance and functionality that meet the expectations of our customers. As such, we continuously invest in our research and development projects, especially AI and computer vision technologies. However, failure to anticipate or timely develop new or enhanced solutions in response to technology shifts and trends could result in decreased revenue and our competitors achieving design wins we sought. Moreover, any reliability or quality problems with our solutions could harm our reputation, increase additional development and replacement costs, and prevent us from retaining existing customers and attracting new customers.

Pricing, Product Cost and Margin. Our pricing and margins depend on the volumes and features of the solutions we provide to our customers. Additionally, we make significant investments in new solutions for both cost improvements and new features that we expect to drive revenue and maintain margins. In general, solutions incorporated into more complex configurations, such as those used in high-performance camera applications or, in the future, advanced driver assistance systems, have higher prices and higher gross margins as compared to solutions sold into lower-performing, more competitive camera applications. Our average selling price can vary by market and application due to market-specific supply and demand, the maturation of products launched in previous years and the launch of new products by us or our competitors.

We continually monitor the cost of our solutions. As we rely on third-party manufacturers for the manufacture of our products, we maintain a close relationship with these suppliers to continually monitor production yields, component costs and design efficiencies.

Continued Concentration of Revenue by End Market. Historically, our revenue has been significantly concentrated in a small number of end markets and we developed technologies to provide solutions for new markets as they emerged. Since fiscal year 2018, the IoT markets and automotive markets have been our largest end markets and sales into these markets collectively generated the majority of our revenue. We believe, however, that continued expansion into new markets is required to facilitate revenue growth and customer diversification. We have recently introduced solutions to address emerging applications and markets, such as the incorporation of AI and computer vision functionalities for AI-enabled security cameras, AI-based driving applications and industrial and robotics markets. While we will continue to seek to expand our end market exposure, we anticipate that sales to a limited number of markets will continue to account for a significant percentage of our total revenue for the foreseeable future. Our limited market concentration may cause our financial performance to fluctuate significantly from period to period based on the success or failure of products that our SoCs are designed into as well as the overall growth or decline in the video capture markets in which we compete. In addition, we derive a significant portion of our revenue from a limited number of ODMs who build products on behalf of a limited number of OEMs and from a limited number of OEMs to whom we ship directly. We believe that our operating results for the foreseeable future will continue to depend on sales to a relatively small number of customers.

Ability to Capitalize on Connectivity Trends. Mobile connected devices are ubiquitous today and play an increasingly prominent role in consumers' lives. The constant connectivity provided by these devices has created a demand for connected electronic peripherals such as video and image capture devices. Our ability to capitalize on these trends by supporting our end customers in the development of connected peripherals that seamlessly cooperate with other connected devices and allow consumers to distribute and share video and images with online media platforms is critical for our success. We incorporate wireless communication functionality into our solutions for wearable, IP security, aerial drone and automotive video recorder cameras. The combination of our compression technology with wireless connectivity enables wireless video streaming and uploading of videos and images to the Internet. Our solutions enable IP security camera systems to stream video content to either cloud infrastructure or connected mobile devices, and our solutions for wearable and aerial drone cameras allow consumers to quickly stream or upload video and images to social media platforms.

Sales Volume. A typical design win that successfully launches into the marketplace can generate a wide range of sales volumes for our solutions, depending on the end market demand for our customers' products. Our ability to accurately forecast demand can be adversely affected by a number of factors, including the reputation of the end customer, market penetration, product capabilities, size of the end market that the product addresses, our end customers' ability to sell their products, miscalculations by our customers of their inventory requirements, changes in market conditions, adverse changes in our product order mix and fluctuating demand for our customers' products. In certain cases, we may provide volume discounts on sales of our solutions, which may be offset by lower manufacturing costs related to higher volumes. In general, our customers with greater market penetration and better branding tend to develop products that generate larger volumes over the product life cycle.

Customer Product Life Cycle. We estimate our customers' product life cycles based on the customer, type of product and end market. We typically commence commercial shipments from 9 to 18 months following a design win; however, in some markets, lengthier product and development cycles are possible, depending on the scope and nature of the project, such as in the automotive market. An IoT product typically has a product life cycle of 6 to 24 months. We anticipate that product development and product life cycles will typically be longer than 24 months in the OEM automotive, Tier-1 automotive suppliers and robotics markets, as new product introductions typically occur less frequently in these markets.

Results of Operations

The following table sets forth our historical operating results for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
	(dollars in thousands)		
Revenue	\$ 337,606	\$ 331,856	\$ 222,990
Cost of revenue	128,672	123,724	87,417
Gross profit	208,934	208,132	135,573
Operating expenses:			
Research and development	204,946	167,337	140,759
Selling, general and administrative	78,244	70,438	55,980
Total operating expenses	283,190	237,775	196,739
Loss from operations	(74,256)	(29,643)	(61,166)
Other income, net	3,318	1,002	3,863
Loss before income taxes	(70,938)	(28,641)	(57,303)
Provision (benefit) for income taxes	(5,552)	(2,230)	2,483
Net loss	\$ (65,386)	\$ (26,411)	\$ (59,786)

The following table sets forth our historical operating results as a percentage of revenue of each line item for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
Revenue	100 %	100 %	100 %
Cost of revenue	38	37	39
Gross profit	62	63	61
Operating expenses:			
Research and development	61	50	63
Selling, general and administrative	23	21	25
Total operating expenses	84	71	88
Loss from operations	(22)	(8)	(27)
Other income, net	1	—	2
Loss before income taxes	(21)	(8)	(25)
Provision (benefit) for income taxes	(2)	—	2
Net loss	(19)%	(8)%	(27)%

Revenue

We derive substantially all of our revenue from the sale of HD and Ultra HD video and image processing SoC solutions to IoT OEMs, IoT ODMs, OEM or Tier-1 automotive suppliers, either directly or through our distributors. In recent years, our SoC solutions have been primarily used in IoT camera markets, such as IP security, automotive video recorder, drone and wearable cameras. Although we expect these human viewing camera markets to continue to generate revenue for the foreseeable future, we have recently introduced new SoCs targeting emerging AI and computer vision applications in the IoT, automotive, industrial and robotics markets. We derive a substantial portion of our revenue from sales made indirectly through one of our distributors, WT Microelectronics Co., Ltd., formerly Wintech Microelectronics Co., Ltd., or WT, and directly to one of our ODM customers, Chicony Electronics Co., Ltd., or Chicony.

The continued effects of the COVID-19 pandemic and persistent supply chain challenges have negatively affected our business performance and revenues this year, and may continue in the next fiscal year. Our average selling prices fluctuate based on the mix of our solutions sold in a period which reflects the impact of both changes in unit sales of existing solutions as well as the introduction and sales of new solutions. Our CV-based solutions generally have higher selling prices than our traditional video and image processing SoC solutions that do not enable CV functionality. Our solutions are typically characterized by a life cycle that begins with higher average selling prices and lower volumes, followed by broader market adoption, higher volumes and average selling prices that are lower than initial levels.

The end markets into which we sell our products have seen significant changes as consumer preferences have evolved in response to new technologies. As a result, the composition and timing of our revenue may differ meaningfully during periods of technology or consumer preference changes. We expect shifts in consumer use of video capture to continue to change over time, as AI and computer vision specialized use cases emerge and video capture continues to proliferate.

Cost of Revenue and Gross Margin

Cost of revenue includes the cost of materials, such as wafers processed by third-party foundries, costs associated with packaging, assembly, testing and manufacturing support operations, such as logistics, planning and quality assurance, as well as personnel costs (including stock-based compensation) related to project service agreements. Cost of revenue also includes indirect costs, such as inventory valuation reserves, adverse purchase commitments, allocation of facility costs, amortization of developed technology, warranty and other general overhead costs.

We expect that our gross margin may fluctuate from period to period as a result of changes in customer mix, average selling price, product mix and the introduction of new products by us or our competitors. In general, solutions incorporated into more complex configurations, such as those used in high-performance cameras, and in future advanced automotive OEM applications, have had or are expected to have higher prices and higher gross margins, as compared to solutions sold into the lower-performance, more competitive camera applications. As semiconductor products mature and unit volumes sold to customers increase, their average selling prices typically decline. These declines may be paired with improvements in manufacturing yields and lower wafer, packaging and test costs, which offset some of the margin reduction that could result from lower selling prices.

Research and Development

Research and development expense consists primarily of personnel costs, including salaries, stock-based compensation and employee benefits. The expense also includes costs of development incurred in connection with our collaborations with our foundry vendors, costs and amortization of licensing intellectual property from third parties for product development, costs of development for software and hardware tools, costs of fabrication of mask sets for prototype products, equipment expenses, outside services as well as allocated depreciation and facility expenses. All research and development costs are expensed as incurred. We expect our research and development expense to increase in absolute dollars as we continue to enhance and expand our product features and offerings and increase headcount for new SoC development and development of computer vision technology.

Selling, General and Administrative

Selling, general and administrative expense consists primarily of personnel costs, including salaries, stock-based compensation and employee benefits for our sales, marketing, finance, human resources, information technology and administrative personnel. The expense also includes amortization of trade name and customer relationships, professional service costs related to accounting, tax, legal services, and allocated depreciation and facility expenses. We expect our selling, general and administrative expense to increase in absolute dollars as we continue to maintain the infrastructure and expand the size of our sales and marketing organization to support our business strategy of addressing new opportunities with our computer vision technology.

Other Income, Net

Other income, net, consists primarily of interest income and realized gains and losses from our cash deposits and debt security investments, subsidies granted by a foreign government as well as gains and losses from foreign currency transactions and remeasurements.

Provision (Benefit) for Income Taxes

We are incorporated and domiciled in the Cayman Islands and also conduct business in several countries such as the United States, China, Taiwan, Hong Kong, Italy, South Korea, Germany, and Japan, and we are subject to taxation in those jurisdictions. Our worldwide operating income is subject to varying tax rates, and our effective tax rate is highly dependent upon the geographic distribution of our earnings or losses and the tax laws and regulations in each geographical region. It is also subject to fluctuation from changes in the valuation of our deferred tax assets and liabilities; tax benefits from excess stock-based compensation deductions; transfer pricing adjustments and the tax effects of nondeductible compensation. We have historically had lower effective tax rates as a substantial percentage of our operations are conducted in lower-tax jurisdictions. If our operational structure were to change in such a manner that would increase the amount of operating income subject to taxation in higher-tax jurisdictions, or if we were to commence operations in jurisdictions assessing relatively higher tax rates, our effective tax rate could fluctuate significantly on a quarterly basis and/or be adversely affected.

Significant judgment is required in evaluating our uncertain tax positions and determining our provision for income taxes. Although we believe our reserves are reasonable, no assurance can be given that the final tax outcome of these matters will not be different from that which is reflected in our historical provision for income taxes and accruals. We adjust these reserves in light of changing facts and circumstances, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences will impact the provision for income taxes in the period in which such determination is made. The provision for income taxes includes the impact of uncertain tax position reserves and changes to reserves that are considered appropriate, as well as the related net interest and penalties.

Significant judgment is also required in determining any valuation allowance recorded against deferred tax assets. In assessing the need for a valuation allowance, we consider all available evidence, including past operating results, estimates of future taxable income, and the feasibility of tax planning strategies. In the event that we change our determination as to the amount of deferred tax assets that can be realized, we will adjust our valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

Comparison of the Fiscal Years Ended January 31, 2023, 2022 and 2021

Revenue

	Year Ended January 31,			Change			
				2023		2022	
	2023	2022	2021	Amount	%	Amount	%
	(dollars in thousands)						
Revenue	\$337,606	\$331,856	\$222,990	\$ 5,750	1.7%	\$108,866	48.8%

Revenue increased for fiscal year 2023, as compared to fiscal year 2022, primarily due to continued adoption of our CV-based solutions, which have higher average selling prices, and increased NRE project services, partially offset by lower product unit shipments driven by customer inventory level reductions as a result of improved supply chain lead times across the semiconductor industry.

Revenue increased for fiscal year 2022, as compared to fiscal year 2021, primarily due to higher product unit shipments driven by higher customer inventory levels as a result of supply chain constraints across the semiconductor industry. The increased revenue was also attributable to continued adoption of our CV-based solutions which have higher average selling prices.

Cost of Revenue and Gross Margin

	Year Ended January 31,			Change			
				2023		2022	
	2023	2022	2021	Amount	%	Amount	%
	(dollars in thousands)						
Cost of revenue	\$128,672	\$123,724	\$ 87,417	\$ 4,948	4.0%	\$ 36,307	41.5%
Gross profit	208,934	208,132	135,573	802	0.4%	72,559	53.5%
Gross margin	61.9%	62.7%	60.8%	—	(0.8)%	—	1.9%

While per unit cost of product shipped largely remained unchanged, cost of revenue increased for fiscal year 2023, as compared to fiscal year 2022, primarily due to \$3.6 million of additional inventory reserves and adverse purchase commitments recognized in fiscal year 2023 caused by lower demand from customers, as well as \$2.1 million of additional amortization of acquisition-related intangible assets associated with business acquisitions, partially offset by lower product unit shipments driven by customer inventory level reductions as a result of improved supply chain lead times across the semiconductor industry.

Cost of revenue increased for fiscal year 2022, as compared to fiscal year 2021, primarily due to increased revenue.

Gross margin decreased in fiscal year 2023, as compared to fiscal year 2022, primarily due to additional charges from inventory reserves and adverse purchase commitments, as well as the amortization of acquisition-related intangible assets, partially offset by a higher percentage of our total revenue from higher gross margin CV-based solutions and higher margin NRE project service revenue contracts.

Gross margin increased in fiscal year 2022, as compared to fiscal year 2021, primarily due to a favorable product mix. A customer concentration shift from China to the Asia region other than China and to North America also contributed to an improvement in gross margin in fiscal year 2022.

Research and Development

	Year Ended January 31,			Change			
	2023	2022	2021	2023		2022	
				Amount	%	Amount	%
	(dollars in thousands)						
Research and development	\$204,946	\$167,337	\$140,759	\$ 37,609	22.5%	\$ 26,578	18.9%

Research and development expense increased for fiscal year 2023, as compared to fiscal year 2022, primarily due to increased personnel costs, engineering-related expenses and SoC development cost. In fiscal year 2023, personnel costs increased by approximately \$22.6 million as a result of higher stock-based compensation expense and an increase of approximately 85 employees throughout the fiscal year, including 44 engineering personnel added due to the acquisition of Oculii in the fourth quarter of fiscal year 2022. Engineering-related expenses, including the cost and depreciation of equipment and tools, amortization of licensed intellectual property, outside services and facility related expenses in support of new SoCs and related applications, increased by approximately \$9.3 million. The increased research and development expense was also attributable to approximately \$5.7 million of additional SoC development cost due to process node technological changes, increased licensed intellectual property associated with the new chips, as well as the number of chips in development.

Research and development expense increased for fiscal year 2022, as compared to fiscal year 2021, primarily due to increased personnel costs and engineering related costs. In fiscal year 2022, personnel costs increased by approximately \$23.7 million as a result of issuance of stock awards, employee benefit programs and an increase in headcount. Our engineering headcount increased to 671 at January 31, 2022, including 44 engineering headcount added from our acquisition of Oculii, compared to 582 at January 31, 2021. Engineering related costs, including equipment expense, outside service and facility related expenses in support of new SoCs and related software, increased by approximately \$7.5 million. The increase was partially offset by decreased SoC development costs due to the timing and number of chips in development. In fiscal year 2022, SoC development costs decreased by approximately \$4.4 million.

Selling, General and Administrative

	Year Ended January 31,			Change			
	2023	2022	2021	2023		2022	
				Amount	%	Amount	%
	(dollars in thousands)						
Selling, general and administrative	\$ 78,244	\$ 70,438	\$ 55,980	\$ 7,806	11.1%	\$ 14,458	25.8%

Selling, general and administrative expense increased for fiscal year 2023, as compared to fiscal year 2022, primarily due to increased personnel costs, marketing, travel, and facility-related expenses as well as the amortization of acquisition-related intangible assets. Personnel costs increased by approximately \$8.2 million as a result of higher stock-based compensation expense and an increase of more than 20 employees. The increase was also attributable to approximately \$1.4 million of additional marketing, travel, and facility-related expenses to support our business development and an additional \$1.4 million of amortization of acquisition-related intangible assets. The increase was partially offset by approximately \$3.1 million less in acquisition-related costs associated with the acquisition of Oculii in the prior fiscal year.

Selling, general and administrative expense increased for fiscal year 2022, as compared to fiscal year 2021, primarily due to increased personnel costs and professional services in support of the Oculii acquisition and business development in the IP security, automotive and robotics markets. In fiscal year 2022, personnel costs increased by approximately \$11.7 million as a result of issuance of stock awards, employee benefit programs and an increase in headcount. The increase was also attributable to approximately \$0.4 million of amortization of acquisition-related intangible assets and \$3.4 million of acquisition-related costs associated with the acquisition of Oculii in fiscal year 2022.

Other Income, Net

	Year Ended January 31,			Change			
				2023		2022	
	2023	2022	2021	Amount	%	Amount	%
	(dollars in thousands)						
Other income, net	\$ 3,318	\$ 1,002	\$ 3,863	\$ 2,316	231.1%	\$ (2,861)	(74.1)%

The increase in other income, net, for fiscal year 2023, as compared to fiscal year 2022, was primarily due to higher yields from our debt security investments driven by security purchases at discounts and higher interest rates. Subsidies received from a foreign government, as well as gains from foreign currency transactions and remeasurements also contributed to the increase.

The decrease in other income, net, for fiscal year 2022, as compared to fiscal year 2021, was primarily due to lower yields from our debt security investments as a result of full liquidation of the investments in fiscal year 2022 to finance the acquisition of Oculii. The decrease was also attributable to net loss from foreign currency transactions and remeasurements due to fluctuations in exchange rates.

Provision (Benefit) for Income Taxes

	Year Ended January 31,			Change			
				2023		2022	
	2023	2022	2021	Amount	%	Amount	%
	(dollars in thousands)						
Provision (benefit) for income taxes	\$ (5,552)	\$ (2,230)	\$ 2,483	\$ (3,322)	149.0%	\$ (4,713)	(189.8)%
Effective tax rate	7.8%	7.8%	(4)%	—	—	—	11.8%

Income tax benefit increased in fiscal 2023, as compared to fiscal year 2022, primarily due to a decrease in the proportion of profits generated in higher tax jurisdictions and the release of prior FIN48 reserves upon the lapse of the statute of limitations, partially offset by an increase in non-deductible stock-based compensation.

Income tax benefit increased in fiscal 2022, as compared to fiscal year 2021, primarily due to a decrease in the proportion of profits generated in higher tax jurisdictions, an increase in the U.S. federal research tax credit, as well as an increase in tax benefits from excess stock-based compensation deductions.

Liquidity and Capital Resources

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
		(in thousands)	
Net cash provided by operating activities	\$ 44,093	\$ 38,795	\$ 30,800
Net cash used in investing activities	(107,295)	(119,551)	(31,324)
Net cash provided by financing activities	5,698	10,525	10,396
Net increase (decrease) in cash, cash equivalents and restricted cash	\$ (57,504)	\$ (70,231)	\$ 9,872

Net Cash Provided by Operating Activities

Fiscal year 2023 compared to fiscal year 2022: Cash provided by operating activities increased primarily due to higher collections of accounts receivable associated with the timing of sales and lower inventory purchases due to customer inventory level reductions as a result of improved supply chain lead times across the semiconductor industry, partially offset by increased net loss adjusted for certain non-cash items and decreased liabilities associated with employee benefit payments and the timing of payments to our suppliers.

Fiscal year 2022 compared to fiscal year 2021: Cash provided by operating activities increased primarily due to decreased net loss, partially offset by increased inventory purchases associated with longer supply chain lead times, increased accounts receivable associated with the timing of sales and decreased liabilities associated with the timing of payments to our suppliers.

Net Cash Used in Investing Activities

Fiscal year 2023 compared to fiscal year 2022: Net cash used in investing activities decreased primarily due to \$307.0 million of net cash paid for the Oculii acquisition in fiscal year 2022, partially offset by approximately \$290.0 million less net cash receipts from debt security investments and approximately \$5.4 million additional payments for purchase of property and equipment and licenses.

Fiscal year 2022 compared to fiscal year 2021: Net cash used in investing activities increased primarily due to \$307.0 million of net cash paid for the Oculii acquisition, \$4.7 million of net cash payments for long-lived assets, partially offset by \$223.5 million of net cash receipts from the liquidation of all of our debt investments to finance the Oculii acquisition in fiscal year 2022.

Net Cash Provided by Financing Activities

Fiscal year 2023 compared to fiscal year 2022: Net cash provided by financing activities decreased primarily due to approximately \$4.7 million less cash proceeds from option exercises and employee stock purchase withholdings.

Fiscal year 2022 compared to fiscal year 2021: Net cash provided by financing activities increased primarily due to \$1.0 million of cash used for repurchasing our ordinary shares under the stock repurchase program in fiscal year 2021 that did not recur in fiscal year 2022, partially offset by \$1.1 million of less cash received from option exercises and employee stock purchases.

Stock Repurchase Program

On March 16, 2020, we repurchased a total of 25,719 of our ordinary shares for approximately \$1.0 million in cash under an authorized repurchase program up to \$50.0 million. Our Board of Directors has approved extensions of the repurchase program through June 30, 2023. There were no shares repurchased in fiscal years 2023 and 2022. As of January 31, 2023, there was approximately \$49.0 million available for repurchases through June 30, 2023. Repurchases under the program may be made from time-to-time through open market purchases, 10b5-1 plans or privately negotiated transactions subject to market conditions, applicable legal requirements and other relevant factors. The repurchase program does not obligate us to acquire any particular amount of ordinary shares, and it may be suspended at any time at the company's discretion. Repurchases are funded using working capital and any repurchased shares are recorded as authorized but unissued shares.

Sources of Liquidity

As of January 31, 2023, we had cash, cash equivalents and marketable debt securities on hand of approximately \$206.9 million, compared with approximately \$171.0 million of cash on hand as of January 31, 2022.

Operating and Capital Expenditure Requirements

As of January 31, 2023, we had cash, cash equivalents and marketable debt securities on hand of approximately \$206.9 million. We believe that our existing cash balances will be sufficient to meet our anticipated cash requirements through at least the next 12 months. In the future, we expect our operating and capital expenditures to increase as we increase headcount, expand our business activities, and implement and enhance our information technology platforms. As we expand our operations, we may require more working capital. If our available cash balances are insufficient to satisfy our future liquidity requirements, we may seek to sell equity or convertible debt securities or borrow funds commercially. The sale of equity and convertible debt securities may result in dilution to our shareholders, and those securities may have rights senior to those of our ordinary shares. If we raise additional funds through the issuance of convertible debt securities or borrowing funds commercially, we may become subject to covenants that would restrict our operations. We may require additional capital beyond our currently anticipated amounts. Additional capital may not be available to us on reasonable terms, or at all.

Our short-term and long-term capital requirements will depend on many factors, including the following:

- our ability to generate cash from operations;
- our ability to control our costs;
- the expansion of our research and development of new technologies and products to address new markets and applications;
- the magnitude and duration of COVID-19 impact, as well as measures implemented to control the spread of the virus;
- the emergence of competing or complementary technologies or products;
- global economic and political conditions, including macroeconomic conditions, high inflation and trade restrictions;
- the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights or participating in litigation-related activities; and
- our acquisition of complementary businesses, products and technologies.

Contractual Obligations, Commitments and Contingencies

The following table summarizes our outstanding contractual obligations as of January 31, 2023:

	Payment Due by Period as of January 31, 2023					
	(in thousands)					
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years	All Other
Contractual Obligations						
Technology licenses ⁽¹⁾	\$ 17,953	\$ 7,764	\$ 10,189	\$ —	\$ —	\$ —
Manufacturing purchase commitments ⁽²⁾	43,556	43,556	—	—	—	—
Capital commitment ⁽³⁾	2,888	2,531	24	24	309	—
Unrecognized tax benefits, including interest ⁽⁴⁾	3,770	—	—	—	—	3,770
Total	<u>\$ 68,167</u>	<u>\$ 53,851</u>	<u>\$ 10,213</u>	<u>\$ 24</u>	<u>\$ 309</u>	<u>\$ 3,770</u>

(1) Technology license obligations represent future cash payments for noncancelable internal-use software licenses used in product design.

(2) Manufacturing purchase commitments consist primarily of inventory purchase commitments with our independent contract manufacturers.

(3) Capital commitment represents future construction cost and lease payments for our office building constructed in Parma, Italy.

(4) Unrecognized tax benefits, including interest, represent our liabilities for uncertain tax positions as of January 31, 2023. We are unable to reasonably estimate the timing of payments in individual years due to uncertainties in the timing of the effective settlement of tax positions.

We also have lease obligations primarily for our worldwide office facilities. As of January 31, 2023, these lease obligations were total of \$9.0 million, with \$3.8 million due in the next 12 months. Refer to Note 9 Leases within Notes to Consolidated Financial Statements for further information.

Stock Options and Restricted Stock Units

Grants of stock-based awards are key components of the compensation packages we provide to attract and retain employees and to align their interests with the interests of shareholders. We recognize that these stock-based awards will dilute existing shareholders and have sought to limit the number of shares granted while providing competitive compensation packages. As of January 31, 2023, we had a total of 3.04 million ordinary shares subject to outstanding stock options and unvested restricted stock units, which will dilute our existing shareholders. This potential dilution will only result if outstanding options vest and are exercised and restricted stock units vest and are settled.

Recent Accounting Pronouncements

See Note 1, “Organization and Summary of Significant Accounting Policies—Recent Accounting Pronouncements” of the Notes to the Consolidated Financial Statements, included in Part IV, Item 15 of this report, for a full description of recent accounting standards, including the respective dates of adoption and effects on our consolidated financial position, results of operations and cash flows.

Critical Accounting Policies and Significant Management Estimates

The preparation of audited consolidated financial statements in conformity with U.S. generally accepted accounting principles, or GAAP, requires us to make estimates, judgments and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expense during the reported periods. On an ongoing basis, we evaluate our estimates and assumptions, including those related to (i) business combinations; (ii) write downs of excess and obsolete inventories; (iii) the estimated useful lives of long-lived assets; (iv) the valuation of stock-based compensation awards; (v) the realization of tax assets and estimates of tax liabilities, including reserves for uncertain tax positions. These estimates and assumptions are based on historical experience and on various other factors which we believe to be reasonable under the circumstances. We may engage third-party valuation specialists to assist with estimates related to the valuation of assets and stock awards associated with various contractual arrangements. Such estimates often require the selection of appropriate valuation methodologies and significant judgment. Actual results could differ from these estimates under different assumptions or circumstances and such differences could be material.

We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management’s judgment and estimates:

Business Combination

In the application of purchase accounting in a business combination, we allocate the purchase price to the assets acquired and liabilities assumed based on their estimated fair values. The excess of the purchase price over the fair values of the identifiable assets and liabilities is recorded as goodwill. We identify an acquired intangible asset apart from goodwill whenever the intangible asset arises from contractual or other legal rights, or when it can be separately sold, transferred, licensed, rented or exchanged. Intangible assets consist primarily of developed technology, customer relationships and trade name. When determining the fair values of assets acquired and liabilities assumed, especially with respect to the intangible assets, we are required to make significant estimates and assumptions. Critical estimates and assumptions used in valuation techniques include, but are not limited to, revenue growth, technology migration curve, customer attrition rate, royalty rates and risk-adjusted discount rates. Our estimates are based on historical data, various internal estimates, and external sources that we believe to be reasonable upon the acquisition date. Actual results could differ from these estimates under different assumptions or circumstances and such differences could be material.

Revenue Recognition

In accordance with Accounting Standards Codification (ASC) 606, Revenue from Contracts with Customers, we recognize revenue when control of goods and services is transferred to our customers. Revenue recognition is evaluated through the following five steps: (i) identification of the contract, or contracts, with a customer; (ii) identification of the performance obligations in the contract; (iii) determination of the transaction price; (iv) allocation of the transaction price to the performance obligations in the contract; and (v) recognition of revenue when or as a performance obligation is satisfied.

The sale of semiconductor products accounts for the substantial majority of our consolidated revenue. Sales agreements with customers are renewable periodically and contain terms and conditions with respect to payment, delivery, warranty, supply and other rights. We consider an accepted customer purchase order, governed by sales agreement, to be the contract with the customer. For each contract, we consider the promise to transfer tangible products to be the identified performance obligation. Product sales contracts may include volume-based tiered pricing or rebates that are fulfilled in cash or product. In determining the transaction price, we account for the right of returns, cash rebates, commissions and other pricing adjustments as variable consideration, estimate these amounts based on the expected amount to be provided to customers and reduce the revenue recognized. We estimate sales returns and rebates based on our historical patterns of return and pricing credits. As our standard payment terms are 30 days to 60 days, the contracts have no financing component. Under ASC 606, we estimate the total consideration to be received by using the expected value method for each contract, compute weighted average selling price for each unit shipped in cases where there is a material right due to the presence of volume-based tiered pricing, allocate the total consideration between the identified performance obligations, and recognize revenue when control of goods and services is transferred to our customers. We consider product control to be transferred at a point in time upon shipment or delivery because we have a present right to payment at that time, the customer has legal title to the asset, we have transferred physical possession of the asset, and the customer has significant risk and rewards of ownership of the asset.

We also enter into various project service agreements with certain customers. These agreements may include multiple performance obligations, such as software development services, licensing of intellectual property and post-contract customer support, or PCS. These multiple performance obligations are highly interdependent, highly interrelated, are typically not sold separately and do not have standalone selling prices. They are all inputs to generate one combined output which is incorporating our SoC into the customer's product. Accordingly, we determine that they are not separately identifiable and shall be treated as a single performance obligation. For fixed-price project service contracts, we recognize revenue either over time as services are provided using an input method based on contract costs incurred to date compared to total estimated contract cost, or at a point in time upon completion and acceptance by the customer, depending on the terms of the arrangement. For project service contracts that are billed at a fixed rate for each hour of service provided, we recognize revenue in the amount for which we have the right to invoice as we believe the amount invoiced directly corresponds with the value to the customer of our performance completed to date.

Timing of revenue recognition may differ from the timing of invoicing to our customers. We record contract assets when revenue is recognized prior to invoicing. Our contract assets are primarily related to the satisfied but unbilled performance obligations associated with project service agreements at the reporting date. As of January 31, 2023 and 2022, the contract assets for these unbilled receivables were not material, respectively. Our contract liabilities consist of deferred revenue. The deferred revenue is primarily related to the nonrecurring engineering charges that are either invoiced or paid but performance obligations are not satisfied associated with project service agreements. The deferred revenue is expected to be recognized over the period when performance obligations are satisfied. Additionally, the value of unsatisfied, or partially unsatisfied, performance obligations for contracts that are greater than a year was not material as of January 31, 2023 and 2022, respectively. We also elect not to disclose the value of unsatisfied or partially unsatisfied performance obligations for contracts with original expected contract duration of one year or less, and elect to exclude amounts collected from customers for all sales taxes from the transaction price.

Inventory Valuation

We record inventories at the lower of cost or net realizable value. The cost includes materials and other production costs and is computed using standard cost on a first-in, first-out basis. Inventory reserves are recorded for estimated obsolescence or unmarketable inventories based on forecast of future demand and market conditions. Any adjustments to reduce the cost of inventories to their net realizable value are recognized in earnings in the current period. Once inventory is written down, a new accounting cost basis is established and, accordingly, any associated reserve is not released until the inventory is sold or scrapped.

Goodwill

We do not amortize goodwill. We test goodwill for impairment at least annually in the fourth fiscal quarter, or sooner whenever events or changes in circumstances indicate that the asset may be impaired. There is only one single reporting unit for goodwill impairment test purposes based on our business and reporting structure. We are permitted to first assess qualitative factors to determine whether the two step goodwill impairment test is necessary. Further testing is only required if we determine, based on the qualitative assessment, that it is more likely than not that the reporting unit's fair value is less than its carrying amount. Otherwise, no further impairment testing is required. Qualitative factors include industry and market considerations, overall financial performance, and other relevant events and factors affecting the reporting unit. No goodwill impairment has been identified to date based on our qualitative factors assessment.

Stock-Based Compensation

We measure stock-based compensation for equity awards granted to employees and directors based on the estimated fair value on the grant date, and recognize that compensation as expense using the straight-line attribution method for service condition awards or using the graded-vesting attribution method for awards with performance conditions over the requisite service period, which is typically the vesting period of each award. We determine the fair value of restricted stock and restricted stock units with service or performance conditions based on the fair market value of our ordinary shares on the grant date. We use the Black-Scholes option pricing model to determine the fair value of stock options. Determining the fair value of stock options on the grant date requires the input of various assumptions, including stock price of the underlying ordinary share, the exercise price of the stock option, expected volatility, expected term, risk-free interest rate and dividend rate. We calculate expected volatility based on our own historical stock price for a period commensurate with the expected term, which is computed based on our own historical exercise behavior. The risk-free interest rate is derived from an average of the U.S. Treasury constant maturity rates for the respective periods most closely commensurate with the expected term. The expected dividend yield is zero because we have not historically paid dividends and have no present intention to pay dividends. We use the Lattice pricing model and perform Monte Carlo Simulations to evaluate the fair value of awards with market conditions, including assumptions of historical volatility and risk-free interest rate commensurate with the vesting term. We elect to account for forfeitures as they occur.

Income Taxes

We record income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in our financial statements or tax returns. In estimating future tax consequences, generally all expected future events other than enactments or changes in the tax law or rates are considered. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount expected to be realized.

We apply authoritative guidance for the accounting for uncertainty in income taxes. The guidance requires that tax effects of a position be recognized only if it is “more likely than not” to be sustained based solely on its technical merits as of the reporting date. Upon estimating our tax positions and tax benefits, we consider and evaluate numerous factors, which may require periodic adjustments and which may not reflect the final tax liabilities. We adjust our financial statements to reflect only those tax positions that are more likely than not to be sustained under examination.

As part of the process of preparing consolidated financial statements, we are required to estimate our taxes in each of the jurisdictions in which we operate. We estimate actual current tax exposure together with assessing temporary differences resulting from differing treatment of items, such as accruals and allowances not currently deductible for tax purposes. These differences result in deferred tax assets, which are included in the consolidated balance sheets. In general, deferred tax assets represent future tax benefits to be received when certain expenses previously recognized in the consolidated statements of operations become deductible expenses under applicable income tax laws, or loss or credit carryforwards are utilized.

In assessing whether deferred tax assets may be realized, we consider whether it is more likely than not that some portion or all of deferred tax assets will be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income.

We make estimates and judgments about our future taxable income based on assumptions that are consistent with our plans and estimates. Should the actual amounts differ from estimates, the amount of valuation allowance could be materially impacted. Any adjustment to the deferred tax asset valuation allowance would be recorded in the consolidated statements of operations for the periods in which the adjustment is determined to be required.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We had cash, cash equivalents and marketable debt securities totaling \$206.9 million at January 31, 2023 and had cash of \$171.0 million at January 31, 2022. Our cash is deposited in checking accounts with reputable financial institutions in excess of the Federal Deposit Insurance Corporation, or FDIC, insurance coverage limit of \$250,000 per depositor, per FDIC-insured bank, per ownership category. The cash equivalents and marketable debt securities consist primarily of investments in money market funds, commercial paper, debt securities of corporations or corporate bonds, asset-backed securities and U.S. government securities. Our cash is held primarily for working capital purposes. We do not enter into investments for trading or speculative purposes.

Interest Rate Fluctuation Risk

The primary objective of our investment activities is to preserve capital, provide liquidity and maximize income without significantly increasing risk. Some of the securities we invest in are subject to market risk. This means that a change in prevailing interest rates may affect the interest income on our cash, cash equivalents and marketable debt securities, and the market value of those securities. To minimize this risk, we maintain our portfolio in a variety of debt securities with high liquidity and low credit risk. The current inflationary environment in the United States and resulting high interest rates have not had a material impact on our investment portfolio and financial position to date. We do not enter into investments for trading or speculative purposes. A hypothetical 10% change in interest rates will not have a material impact on our future interest income or investment fair value. The liquidity risk and the risk associated with fluctuating interest rates are limited to our investment portfolio.

Foreign Currency Risk

To date, all of our product sales and inventory purchases have been denominated in U.S. dollars. We therefore have not had any foreign currency risk associated with these two activities. The functional currency of all of our entities is the U.S. dollar. Our operations outside of the United States incur operating expenses and hold assets and liabilities denominated in foreign currencies, principally the New Taiwan Dollar, the Chinese Yuan Renminbi and the Eurozone Euro. Our results of operations and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. As we grow our operations, our exposure to foreign currency risk could become more significant. To date, we have not entered into any foreign currency exchange contracts and currently do not expect to enter into foreign currency exchange contracts for trading or speculative purposes.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The financial statements required by this Item are set forth as a separate section of this Annual Report on Form 10-K. See Item 15 for a listing of financial statements provided in the section titled “Financial Statements.”

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Principal Executive Officer and Principal Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures as of the end of the period covered by this Annual Report on Form 10-K. The term “disclosure controls and procedures” (as defined in Rules 13a- 15(e) and 15d- 15(e)) under the Exchange Act, means controls and other procedures of a company that 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 recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures 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 accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Based upon such evaluation, our Principal Executive Officer and Principal Financial Officer have concluded that, as of January 31, 2023, our disclosure controls and procedures were effective at the reasonable assurance level.

Management’s Report on Internal Control over Financial Reporting

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15(d)-15(f) under the Exchange Act. The Company’s internal control over financial reporting is 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. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. 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.

Management has evaluated the effectiveness of our internal control over financial reporting based on the framework in *Internal Control-Integrated Framework (2013)*, issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, management has concluded that our internal control over financial reporting was effective as of January 31, 2023.

The effectiveness of our internal control over financial reporting as of January 31, 2023 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which appears herein.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting during the Company’s fiscal quarter ended January 31, 2023 that have materially affected, or are reasonably likely to materially affect, the Company’s internal control over financial reporting.

Inherent Limitations of Disclosure Controls and Internal Control over Financial Reporting

Because of their inherent limitations, our disclosure controls and procedures and our internal control over financial reporting may not prevent material errors or fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. The effectiveness of our disclosure controls and procedures and our internal control over financial reporting is subject to risks, including that the controls may become inadequate because of changes in conditions or that the degree of compliance with our policies or procedures may deteriorate.

ITEM 9B. OTHER INFORMATION

Not applicable.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2023 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

We have a Code of Business Conduct and Ethics for all of our directors, officers and employees. We also have a Code of Ethics for Finance Team applicable to our Chief Executive Officer, Chief Financial Officer and other Senior Financial Officers. These documents are available on our website at <http://investor.ambarella.com/corporate-governance>. To date, there have been no waivers under our Code of Business Conduct and Ethics and Code of Ethics for Finance Team. We will post any amendments or waivers, if and when granted, of our Code of Business Conduct and Ethics and Code of Ethics for Finance Team on our website.

ITEM 11. EXECUTIVE COMPENSATION

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2023 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2023 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2023 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2023 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) (1) Financial Statements

The following consolidated financial statements of the Registrant and Report of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm, are included herewith:

<u>Financial Statement Description</u>	<u>Page</u>
• Report of Independent Registered Public Accounting Firm (PCAOB ID: 238)	71
• Consolidated Balance Sheets As of January 31, 2023 and 2022	73
• Consolidated Statements of Operations For the Years Ended January 31, 2023, 2022 and 2021	74
• Consolidated Statements of Comprehensive Loss For the Years Ended January 31, 2023, 2022 and 2021 ..	75
• Consolidated Statements of Shareholders' Equity For the Years Ended January 31, 2023, 2022 and 2021 .	76
• Consolidated Statements of Cash Flows For the Years Ended January 31, 2023, 2022 and 2021	77
• Notes to Consolidated Financial Statements	78

(a) (2) Financial Statement Schedule

Financial statement schedules are omitted because they are not applicable or the required information is shown in the Financial Statements or the notes thereto.

(b) Exhibits

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

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Ambarella, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Ambarella, Inc. and its subsidiaries (the “Company”) as of January 31, 2023 and 2022, and the related consolidated statements of operations, of comprehensive loss, of shareholders' equity and of cash flows for each of the three years in the period ended January 31, 2023, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of January 31, 2023, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of January 31, 2023 and 2022, and the results of its operations and its cash flows for each of the three years in the period ended January 31, 2023 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of January 31, 2023, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

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

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

Critical Audit Matters

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

Accounting for Income Taxes

As described in Notes 1 and 14 to the consolidated financial statements, the Company's accounting for income taxes requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in its financial statements or tax returns. Management evaluates the realization of tax assets and estimates of tax liabilities, including reserves for uncertain tax positions. Upon estimating the Company's tax positions and tax benefits, management considers and evaluates numerous factors, which may require periodic adjustments and which may not reflect the final tax liabilities. Management adjusts the Company's financial statements to reflect only those tax positions that are more likely than not to be sustained under examination, and considers whether a valuation allowance should be established against the Company's deferred tax assets based on the consideration of all available evidence. As part of the process of preparing consolidated financial statements, the Company is required to estimate its taxes in each of the jurisdictions in which it operates. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount expected to be realized. The Company's worldwide operating income is subject to varying tax rates and its effective tax rate is highly dependent upon the geographic distribution of its earnings or losses and the tax laws and regulations in each geographical region. As disclosed by management, the Company's effective tax rate of 7.8% for the year ended January 31, 2023 is different than the U.S. federal statutory rate of 21%.

The principal considerations for our determination that performing procedures relating to accounting for income taxes is a critical audit matter are the significant judgment by management in determining the income tax provision and other tax positions, specifically in the determination of taxable income or loss by jurisdiction taxed or benefited at rates other than the U.S. federal statutory rate, and the recognition and measurement of deferred tax assets, valuation allowances, and uncertain tax positions. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing audit procedures and evaluating audit evidence related to income taxes. Also, the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to accounting for income taxes, including those related to the determination of taxable income or loss by jurisdiction taxed or benefited at rates other than the U.S. federal statutory rate, and the recognition and measurement of deferred tax assets, valuation allowances, and uncertain tax positions. These procedures also included, among others (i) testing the calculation of the income tax provision, including taxable income by jurisdiction, (ii) evaluating the reasonableness of the cost plus percentages applied for entities selected for testing based on management's methodology for determining taxable income or loss by jurisdiction, (iii) evaluating the recognition and measurement of valuation allowances selected for testing, and (iv) evaluating the recognition and measurement of uncertain tax positions, including management's assessment of the technical merits of tax positions and estimates of the amount of tax benefit expected to be sustained for the uncertain tax position selected for testing. Professionals with specialized skill and knowledge were used to assist in evaluating the appropriateness of management's judgment and estimates related to management's methodology for determining taxable income or loss by jurisdiction, which included evaluation of management's application of relevant rules for determining arm's length compensation for services.

/s/ PricewaterhouseCoopers LLP
San Jose, California
March 31, 2023

We have served as the Company's auditor since 2008.

AMBARELLA, INC.
CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share data)

	As of	
	January 31, 2023	January 31, 2022
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 113,541	\$ 171,043
Marketable debt securities	93,322	—
Accounts receivable, net	51,987	44,307
Inventories	40,486	45,219
Restricted cash	8	10
Prepaid expenses and other current assets	5,288	6,169
Total current assets	304,632	266,748
Property and equipment, net	11,814	10,134
Deferred tax assets, non-current	19,276	15,340
Intangible assets, net	58,497	46,302
Operating lease right-of-use assets, net	8,339	11,127
Goodwill	303,625	303,625
Other non-current assets	4,012	4,269
Total assets	\$ 710,195	\$ 657,545
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	17,845	31,170
Accrued and other current liabilities	56,655	52,064
Operating lease liabilities, current	3,539	3,391
Income taxes payable	4,112	1,245
Deferred revenue, current	1,311	1,414
Total current liabilities	83,462	89,284
Operating lease liabilities, non-current	5,097	8,322
Other long-term liabilities	15,548	12,763
Total liabilities	104,107	110,369
Commitments and contingencies (Note 15)		
Shareholders' equity:		
Preference shares, \$0.00045 par value per share, 20,000,000 shares authorized and no shares issued and outstanding at January 31, 2023 and January 31, 2022, respectively	—	—
Ordinary shares, \$0.00045 par value per share, 200,000,000 shares authorized; 39,043,000 and 37,302,818 shares issued and outstanding at January 31, 2023 and January 31, 2022, respectively	18	17
Additional paid-in capital	572,076	447,287
Accumulated other comprehensive loss	(492)	—
Retained earnings	34,486	99,872
Total shareholders' equity	606,088	547,176
Total liabilities and shareholders' equity	\$ 710,195	\$ 657,545

See accompanying notes to consolidated financial statements.

AMBARELLA, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except share and per share data)

	<u>Year Ended January 31,</u>		
	<u>2023</u>	<u>2022</u>	<u>2021</u>
Revenue	\$ 337,606	\$ 331,856	\$ 222,990
Cost of revenue	<u>128,672</u>	<u>123,724</u>	<u>87,417</u>
Gross profit	<u>208,934</u>	<u>208,132</u>	<u>135,573</u>
Operating expenses:			
Research and development	204,946	167,337	140,759
Selling, general and administrative	<u>78,244</u>	<u>70,438</u>	<u>55,980</u>
Total operating expenses	<u>283,190</u>	<u>237,775</u>	<u>196,739</u>
Loss from operations	(74,256)	(29,643)	(61,166)
Other income, net	<u>3,318</u>	<u>1,002</u>	<u>3,863</u>
Loss before income taxes	<u>(70,938)</u>	<u>(28,641)</u>	<u>(57,303)</u>
Provision (benefit) for income taxes	<u>(5,552)</u>	<u>(2,230)</u>	<u>2,483</u>
Net loss	<u>\$ (65,386)</u>	<u>\$ (26,411)</u>	<u>\$ (59,786)</u>
Net loss per share attributable to ordinary shareholders:			
Basic	<u>\$ (1.70)</u>	<u>\$ (0.72)</u>	<u>\$ (1.72)</u>
Diluted	<u>\$ (1.70)</u>	<u>\$ (0.72)</u>	<u>\$ (1.72)</u>
Weighted-average shares used to compute net loss per share attributable to ordinary shareholders:			
Basic	<u>38,363,638</u>	<u>36,577,120</u>	<u>34,679,717</u>
Diluted	<u>38,363,638</u>	<u>36,577,120</u>	<u>34,679,717</u>

See accompanying notes to consolidated financial statements.

AMBARELLA, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

	Year Ended January 31,		
	2023	2022	2021
Net loss	\$ (65,386)	\$ (26,411)	\$ (59,786)
Other comprehensive income (loss), net of tax:			
Net unrealized gains (losses) on investments	(492)	—	451
Reclassification of unrealized gains (losses) on investments	—	(1,219)	—
Other comprehensive income (loss), net of tax	(492)	(1,219)	451
Comprehensive loss	\$ (65,878)	\$ (27,630)	\$ (59,335)

See accompanying notes to consolidated financial statements.

AMBARELLA, INC.
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
(in thousands, except share data)

	Outstanding Ordinary Shares		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Retained Earnings	Total
	Shares	Amount				
Balance--January 31, 2020	<u>33,805,609</u>	<u>\$ 15</u>	<u>\$ 261,220</u>	<u>\$ 768</u>	<u>\$ 186,069</u>	<u>\$ 448,072</u>
Issuance of shares through employee equity plans	1,584,619	1	15,683	—	—	15,684
Issuance of shares through employee stock purchase plan	182,931	—	5,825	—	—	5,825
Stock repurchase	(25,719)	—	(1,000)	—	—	(1,000)
Stock-based compensation expense	—	—	65,730	—	—	65,730
Other comprehensive income - net of tax	—	—	—	451	—	451
Net loss	—	—	—	—	(59,786)	(59,786)
Balance--January 31, 2021	<u>35,547,440</u>	<u>16</u>	<u>347,458</u>	<u>1,219</u>	<u>126,283</u>	<u>474,976</u>
Issuance of shares through employee equity plans	1,636,596	1	12,194	—	—	12,195
Issuance of shares through employee stock purchase plan	118,782	—	7,208	—	—	7,208
Fair value of partially vested equity awards assumed in connection with acquisition	—	—	407	—	—	407
Stock-based compensation expense	—	—	80,020	—	—	80,020
Other comprehensive loss - net of tax	—	—	—	(1,219)	—	(1,219)
Net loss	—	—	—	—	(26,411)	(26,411)
Balance--January 31, 2022	<u>37,302,818</u>	<u>17</u>	<u>447,287</u>	<u>—</u>	<u>99,872</u>	<u>547,176</u>
Issuance of shares through employee equity plans	1,635,596	1	11,408	—	—	11,409
Issuance of shares through employee stock purchase plan	104,586	—	6,636	—	—	6,636
Stock-based compensation expense	—	—	106,745	—	—	106,745
Other comprehensive loss - net of tax	—	—	—	(492)	—	(492)
Net loss	—	—	—	—	(65,386)	(65,386)
Balance--January 31, 2023	<u>39,043,000</u>	<u>\$ 18</u>	<u>\$ 572,076</u>	<u>\$ (492)</u>	<u>\$ 34,486</u>	<u>\$ 606,088</u>

See accompanying notes to consolidated financial statements.

AMBARELLA, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended January 31,		
	2023	2022	2021
Cash flows from operating activities:			
Net loss	\$ (65,386)	\$ (26,411)	\$ (59,786)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Depreciation and amortization	19,934	14,007	11,967
Amortization (accretion) of premium (discount) on marketable debt securities, net	(683)	1,034	721
Stock-based compensation	111,158	87,801	70,134
Deferred income taxes	(3,936)	(4,426)	(514)
Other non-cash items, net	(751)	(509)	65
Changes in operating assets and liabilities:			
Accounts receivable	(7,680)	(18,600)	(6,487)
Inventories	4,733	(18,944)	(3,110)
Prepaid expenses and other current assets	153	228	(537)
Other non-current assets	978	832	1,141
Accounts payable	(13,325)	9,822	6,214
Accrued and other current liabilities	5,225	(1,954)	12,055
Income taxes payable	2,867	83	272
Deferred revenue	1,012	(131)	144
Operating lease liabilities	(4,011)	(3,608)	(2,416)
Other long-term liabilities	(6,195)	(429)	937
Net cash provided by operating activities	<u>44,093</u>	<u>38,795</u>	<u>30,800</u>
Cash flows from investing activities:			
Acquisition, net of cash acquired	—	(307,038)	—
Purchases of investments	(97,437)	(118,726)	(219,677)
Sales of investments	2,444	208,132	70,087
Maturities of investments	2,000	107,760	123,208
Purchase of tangible and intangible assets	(15,051)	(9,679)	(4,942)
Escrow claim associated with business acquisition	749	—	—
Net cash used in investing activities	<u>(107,295)</u>	<u>(119,551)</u>	<u>(31,324)</u>
Cash flows from financing activities:			
Stock repurchase	—	—	(1,000)
Proceeds from exercise of stock options and employee stock purchase plan	10,585	15,292	16,417
Long-term financing payment for intangible assets	(4,887)	(4,767)	(5,021)
Net cash provided by financing activities	<u>5,698</u>	<u>10,525</u>	<u>10,396</u>
Net increase (decrease) in cash, cash equivalents and restricted cash	(57,504)	(70,231)	9,872
Cash, cash equivalents and restricted cash at beginning of period	171,053	241,284	231,412
Cash, cash equivalents and restricted cash at end of period	<u>\$ 113,549</u>	<u>\$ 171,053</u>	<u>\$ 241,284</u>
Supplemental disclosure of cash flow information:			
Cash paid for income taxes	<u>\$ 1,444</u>	<u>\$ 1,869</u>	<u>\$ 1,531</u>
Supplemental disclosure of noncash investing activities:			
Unpaid liabilities related to tangible and intangible assets purchases	<u>\$ 16,410</u>	<u>\$ 1,569</u>	<u>\$ 4,302</u>

See accompanying notes to consolidated financial statements

AMBARELLA, INC.
Notes to Consolidated Financial Statements

1. Organization and Summary of Significant Accounting Policies

Organization

Ambarella, Inc. (the Company) was incorporated in the Cayman Islands on January 15, 2004. The Company is a leading developer of low-power semiconductor solutions offering high-definition (HD) and Ultra HD compression, image processing, and powerful deep neural network processing. The Company combines its processor design capabilities with its expertise in video and image processing, algorithms and software to provide a technology platform that is designed to be easily scalable across multiple applications and enable rapid and efficient product development. The Company's system-on-a-chip, or SoC, designs fully integrate high-definition video processing, image processing, artificial intelligence (AI) computer vision algorithms, audio processing and system functions onto a single chip. These low power SoCs deliver exceptional video and image quality and can extract valuable data from high-resolution video and radar streams. The Company is currently addressing a broad range of human and computer vision applications, including video security, advanced driver assistance systems (ADAS), electronic mirrors, drive recorders, driver/cabin monitoring systems, autonomous driving, and industrial and robotic applications.

The Company sells its solutions to leading original equipment manufacturers, or OEMs, who include the Company's SoCs in their products, and original design manufacturers, or ODMs, who include the Company's SoCs in the products that they supply to OEMs, globally.

Basis of Consolidation

The Company's fiscal year ends on January 31. The consolidated financial statements of the Company and its subsidiaries have been prepared in conformity with U.S. GAAP. All intercompany transactions and balances have been eliminated upon consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expense during the reported periods. Actual results could differ from those estimates.

On an ongoing basis, management evaluates its estimates and assumptions, including those related to (i) business combinations; (ii) write downs of excess and obsolete inventories; (iii) the estimated useful lives of long-lived assets; (iv) the valuation of stock-based compensation awards; (v) the realization of tax assets and estimates of tax liabilities, including reserves for uncertain tax positions. These estimates and assumptions are based on historical experience and on various other factors which the Company believes to be reasonable under the circumstances. The Company may engage third-party valuation specialists to assist with estimates related to the valuation of assets and stock awards associated with various contractual arrangements. Such estimates often require the selection of appropriate valuation methodologies and significant judgment. Actual results could differ from these estimates under different assumptions or circumstances and such differences could be material.

Concentration of Risk

The Company's products are manufactured, assembled and tested by third-party contractors located primarily in Asia. The Company does not have long-term agreements with these contractors. A significant disruption in the operations of one or more of these contractors would impact the production of the Company's products which could have a material adverse effect on its business, financial condition and results of operations.

A substantial portion of the Company's revenue is derived from sales through one of its distributors, WT Microelectronics Co., Ltd., formerly Wintech Microelectronics Co., Ltd., or WT, which serves as its non-exclusive sales representative in Asia other than Japan, and directly to one ODM customer, Chicony Electronics Co., Ltd., or Chicony. Termination of the relationships with these customers could result in a temporary or permanent loss of revenue. Furthermore, any credit issues from these customers could impair their abilities to make timely payment to the Company. See Note 16 for additional information regarding revenue and credit concentration with these customers.

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash, cash equivalents, marketable debt securities and accounts receivable. The Company maintains its cash primarily in checking accounts with reputable financial institutions. Cash deposits held with these financial institutions may exceed the amount of insurance provided on such deposits. The Company has not experienced any losses on deposits of its cash. In order to limit the exposure of each investment, the cash equivalents and marketable debt securities consist primarily of money market funds, commercial paper, debt securities of corporations or corporate bonds, asset-backed securities and U.S. government securities which management assesses to be highly liquid. The Company does not hold or issue financial instruments for trading purposes.

The Company performs ongoing credit evaluation of its customers and adjusts credit limits based upon payment history and customers' credit worthiness. The Company regularly monitors collections and payments from its customers.

Foreign Currency Transactions

The U.S. dollar is the functional currency for the Company and its subsidiaries. Monetary assets and liabilities denominated in non-U.S. currencies are re-measured to U.S. dollars using current exchange rates in effect at the balance sheet date. Nonmonetary assets and liabilities are re-measured to U.S. dollars using historical exchange rates. Monetary and other accounts are re-measured to U.S. dollars using average exchange rates in effect during each period. Gains or losses from foreign currency re-measurement are included in other income, net in the consolidated statements of operations, and, to date, have not been material.

Fair Value of Financial Instruments

Fair value accounting is applied to all financial assets and liabilities and non-financial assets and liabilities that are recognized or disclosed in the financial statements on a recurring basis. The carrying amounts reflected in the consolidated balance sheets for cash equivalents, accounts receivable, accounts payable, accrued liabilities and other current liabilities, approximate fair value due to the short-term nature.

Cash Equivalents and Marketable Debt Securities

The Company considers all highly liquid debt security investments with original maturities of less than three months at the time of purchase to be cash equivalents. Debt security investments that are highly liquid with original maturities at the time of purchase greater than three months are considered marketable debt securities. The Company classifies these investments as "available-for-sale" (AFS) securities.

In accordance with Accounting Standards Update (ASU) No. 2016-13, Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, the Company estimates the expected losses whenever a security's fair value is below its amortized cost basis. The expected loss is computed at an individual security level using the discounted cash flow method with the effective interest rate on the purchase date. In the determination of credit-related losses, the Company excludes securities with zero loss expectation such as assets backed by government agencies. There are various factors considered in its assessment of credit-related losses, including the extent to which the fair value is less than the amortized cost basis, adverse conditions related to an industry or an underlying loan obligator, the payment structure of the security, changes to the rating of the security and other factors that may affect the security credit. The credit-related portion of the loss is recognized in other income, net in the consolidated statements of operations but is limited to the difference between the fair value and the amortized cost basis of the security, adjusted for accrued interest. The non-credit-related portion of the loss is recognized in accumulated other comprehensive loss in the consolidated balance sheets.

The Company measures the fair value of money market funds using quoted prices in active markets for identical assets and classifies them within Level 1. The fair value of the Company's investments in other debt securities are obtained based on quoted prices for similar assets in active markets, or model driven valuations using significant inputs derived from or corroborated by observable market data and are classified within Level 2. The Company does not have debt securities under unobservable inputs and classified within Level 3.

Restricted Cash

Amounts included in restricted cash represent those required to be set aside to secure certain transactions in a foreign entity. As of January 31, 2023 and 2022, the restricted cash was immaterial, respectively. The following table presents cash, cash equivalents and restricted cash reported on the consolidated balance sheets, and the sums are presented on the consolidated statements of cash flows:

	As of January 31,		
	2023	2022	2021
		(in thousands)	
Cash and cash equivalents	\$ 113,541	\$ 171,043	\$ 241,274
Restricted cash	8	10	10
Total as presented in the consolidated statements of cash flows	<u>\$ 113,549</u>	<u>\$ 171,053</u>	<u>\$ 241,284</u>

Trade Accounts Receivable and Allowance for Credit Losses

The Company's accounts receivables are recorded at invoiced amounts less allowance for any credit losses. In arrangements where revenue recognition occurs in advance of invoicing, an unbilled receivable is recorded, less allowance for any credit losses, within accounts receivable, when collection of these unbilled amounts are conditional only on the passage of time. According to ASU 2016-13, the Company recognizes credit losses based on a forward-looking current expected credit losses (CECL). The Company makes estimates of expected credit losses based upon its assessment of various factors, including historical collection experience, the age of accounts receivable balances, credit quality of its customers, current economic conditions, reasonable and supportable forecasts of future economic conditions, and other factors that may affect its ability to collect from customers. The changes in allowance for credit losses are recognized in the consolidated statement of operations. The uncollectible accounts receivables are written off in the period in which a determination is made that all commercially reasonable means of recovering them have been exhausted. There were no material credit losses and write-offs of accounts receivable for the fiscal years ended January 31, 2023, 2022 and 2021, respectively. There was no material allowance recorded as of January 31, 2023 and 2022, respectively.

Inventories

The Company records inventories at the lower of cost or net realizable value. The cost includes materials and other production costs and is computed using standard cost on a first-in, first-out basis. Inventory reserves are recorded for estimated obsolescence or unmarketable inventories based on forecast of future demand and market conditions. Any adjustments to reduce the cost of inventories to their net realizable value are recognized in earnings in the current period. Once inventory is written down, a new accounting cost basis is established and, accordingly, any associated reserve is not released until the inventory is sold or scrapped.

Property and Equipment

Property and equipment are stated at cost and depreciated using the straight-line method over the estimated useful life for computer equipment, computer software, machinery, equipment and furniture and fixtures. Leasehold improvements are amortized over the shorter of the lease term or their estimated useful lives. Repairs and maintenance are charged to expense as incurred.

Intangible Assets

The Company's intangible assets primarily consist of acquired intangible assets, including developed technology, customer relationships and trade name, as well as software licenses. The acquired intangible assets are amortized over their estimated useful lives.

The Company's in-process research and development, or IPR&D, is initially capitalized at fair value with an indefinite life and amortization commences upon completion of the underlying projects. When a project underlying reported IPR&D is completed, the corresponding amount of IPR&D is reclassified as an amortizable purchased intangible asset and is amortized over its estimated useful life.

The Company accounts for a noncancelable on-premise internal-use software license as the acquisition of an intangible asset and the incurrence of a liability to the extent that all or a portion of the software licensing fees are not paid on or before the license acquisition date. The intangible asset and related liability are recorded at net present value and interest expense is recorded over the payment term. The software license is amortized over its license term.

The Company expenses the cost of purchased software that is to be sold, leased or otherwise marketed as part of a product until the technological feasibility of the product has been established. Once the technological feasibility of the product, to be externally marketed, has been established or where the software has an alternative future use, the Company capitalizes the cost of purchased software until the associated product is available for general release to customers, at which point the capitalized cost is amortized on a product-by-product basis over the remaining estimated economic life of the product.

Leases

In accordance with the Accounting Standards Codification (ASC) Topic 842, Leases, the Company recognizes leases as operating lease right-of-use (“ROU”) assets and corresponding lease liabilities at the lease commencement date based on the present value of future lease payments, while recognizing lease expenses under straight-line method through the lease term. The Company also elected the practical expedient that does not recognize ROU assets and lease liabilities that arise from short-term (12 months or less) leases. The Company does not combine lease components with non-lease components, and as a result, the non-lease components are accounted for separately. In determining the present value of lease payments, the Company uses the implicit interest rate if readily determinable. When the implicit rate is not readily determinable, the Company uses its incremental borrowing rate based on the information available at the lease commencement date. The Company's leases mainly include its worldwide office facilities which are all classified as operating leases. Certain leases include renewal options that are under the Company's discretion. The renewal options are included in the ROU asset and liability calculation if it is reasonably certain that the Company will exercise the option. The Company's finance leases were immaterial as of January 31, 2023 and 2022, respectively.

Business Combination

In the application of purchase accounting in a business combination, the Company allocates the purchase price to the assets acquired and liabilities assumed based on their estimated fair values. The excess of the purchase price over the fair values of the identifiable assets and liabilities is recorded as goodwill. The Company identifies an acquired intangible asset apart from goodwill whenever the intangible asset arises from contractual or other legal rights, or when it can be separately sold, transferred, licensed, rented or exchanged. Intangible assets consist primarily of developed technology, customer relationships and trade name. When determining the fair values of assets acquired and liabilities assumed, especially with respect to the intangible assets, the Company is required to make significant estimates and assumptions. Critical estimates and assumptions used in valuation techniques include, but are not limited to, revenue growth, technology migration curve, customer attrition rate, royalty rates and risk-adjusted discount rates. The estimates are based on historical data, various internal estimates, and external sources that the Company believes to be reasonable upon the acquisition date. Actual results could differ from these estimates under different assumptions or circumstances and such differences could be material.

Goodwill

The Company does not amortize goodwill. The Company tests goodwill for impairment at least annually in the fourth fiscal quarter, or sooner whenever events or changes in circumstances indicate that the asset may be impaired. There is only one single reporting unit for goodwill impairment test purposes based on the Company's business and reporting structure. The Company is permitted to first assess qualitative factors to determine whether the two step goodwill impairment test is necessary. Further testing is only required if the Company determines, based on the qualitative assessment, that it is more likely than not that the reporting unit's fair value is less than its carrying amount. Otherwise, no further impairment testing is required. Qualitative factors include industry and market considerations, overall financial performance, and other relevant events and factors affecting the reporting unit. No goodwill impairment has been identified to date based on the Company's qualitative factors assessment.

Impairment of Long-Lived Assets Excluding Goodwill

The Company reviews property and equipment and intangible assets, excluding goodwill, for impairment at least annually in the fourth fiscal quarter or whenever events or changes in circumstances indicate that the carrying amount of an asset, or asset group, may not be recoverable. Determination of recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset, or asset group to estimated undiscounted future cash flows expected to be generated by the asset, or asset group. If the carrying amount of an asset or asset group exceeds its estimated undiscounted future cash flows, an impairment charge is recognized for the amount by which the carrying amount of the asset or asset group exceeds the estimated fair value of the asset or asset group. Fair value is determined based on the estimated discounted future cash flows expected to be generated by the asset or asset group. Events or changes in circumstances that may indicate that an asset is impaired include significant decreases in the market value of an asset, significant underperformance relative to expected historical or projected future results of operations, a change in the extent or manner in which an asset is utilized, significant declines in the estimated fair value of the overall Company for a sustained period, shifts in technology, loss of key management or personnel, changes in the Company's operating model or strategy and competitive forces. There has been no occurrence of events or indications to date that would trigger an impairment. As such, no impairment charge has been recognized as of January 31, 2023.

Equity Investment

The Company accounts for its investments in privately held companies as equity investments and reports the investments in other non-current assets in the consolidated balance sheets. The Company chooses to measure these equity investments that do not have readily determinable fair value at cost minus any recorded impairments, adjusted for subsequent observable price changes in transactions for an identical or similar investment of the same issuers. Upon determining that an impairment or observable price change exists, the Company records any adjustment to the fair value of the investment through other income, net in the consolidated statements of operations. To date, there have been no significant changes on the fair value of the investments and the Company did not recognize any impairment losses related to these investments in the fiscal years ended January 31, 2023, 2022 and 2021, respectively.

Revenue Recognition

In accordance with ASC 606, Revenue from Contracts with Customers, the Company recognizes revenue when control of its goods and services is transferred to its customers. Revenue recognition is evaluated through the following five steps: (i) identification of the contract, or contracts, with a customer; (ii) identification of the performance obligations in the contract; (iii) determination of the transaction price; (iv) allocation of the transaction price to the performance obligations in the contract; and (v) recognition of revenue when or as a performance obligation is satisfied.

The sale of semiconductor products accounts for the substantial majority of the Company's consolidated revenue. Sales agreements with customers are renewable periodically and contain terms and conditions with respect to payment, delivery, warranty, supply and other rights. The Company considers an accepted customer purchase order, governed by sales agreement, to be the contract with the customer. For each contract, the Company considers the promise to transfer tangible products to be the identified performance obligation. Product sales contracts may include volume-based tiered pricing or rebates that are fulfilled in cash or product. In determining the transaction price, the Company accounts for the right of returns, cash rebates, commissions and other pricing adjustments as variable consideration, estimates these amounts based on the expected amount to be provided to customers and reduces the revenue recognized. The Company estimates sales returns and rebates based on the Company's historical patterns of return and pricing credits. As the Company's standard payment terms are 30 days to 60 days, the contracts have no financing component. Under ASC 606, the Company estimates the total consideration to be received by using the expected value method for each contract, computes weighted average selling price for each unit shipped in cases where there is a material right due to the presence of volume-based tiered pricing, allocates the total consideration between the identified performance obligations, and recognizes revenue when control of its goods and services is transferred to its customers. The Company considers product control to be transferred at a point in time upon shipment or delivery because the Company has a present right to payment at that time, the customer has legal title to the asset, the Company has transferred physical possession of the asset, and the customer has significant risk and rewards of ownership of the asset.

The Company also enters into various project service agreements with certain customers. These agreements may include multiple performance obligations, such as software development services, licensing of intellectual property and post-contract customer support, or PCS. These multiple performance obligations are highly interdependent, highly interrelated, are typically not sold separately and do not have standalone selling prices. They are all inputs to generate one combined output which is incorporating its SoC into the customer's product. Accordingly, the Company determines that they are not separately identifiable and shall be treated as a single performance obligation. For fixed-price project service contracts, the Company recognizes revenue either over time as services are provided using an input method based on contract costs incurred to date compared to total estimated contract cost, or at a point in time upon completion and acceptance by the customer, depending on the terms of the arrangement. For project service contracts that are billed at a fixed rate for each hour of service provided, the Company recognizes revenue in the amount for which the Company has the right to invoice as the Company believes the amount invoiced directly corresponds with the value to the customer of its performance completed to date.

Timing of revenue recognition may differ from the timing of invoicing to the Company's customers. The Company records contract assets when revenue is recognized prior to invoicing. The Company's contract assets are primarily related to the satisfied but unbilled performance obligations associated with project service agreements at the reporting date. As of January 31, 2023 and 2022, the contract assets for these unbilled receivables were not material, respectively. The Company's contract liabilities consist of deferred revenue. The deferred revenue is primarily related to the nonrecurring engineering charges that are either invoiced or paid but performance obligations are not satisfied associated with project service agreements. The deferred revenue is expected to be recognized over the period when performance obligations are satisfied. Additionally, the value of unsatisfied, or partially unsatisfied, performance obligations for contracts that are greater than a year was not material as of January 31, 2023 and 2022, respectively. The Company also elects not to disclose the value of unsatisfied or partially unsatisfied performance obligations for contracts with original expected contract duration of one year or less, and elects to exclude amounts collected from customers for all sales taxes from the transaction price.

Cost of Revenue

Cost of revenue includes the cost of materials, such as wafers processed by third-party foundries, costs associated with packaging, assembly, testing and manufacturing support operations, such as logistics, planning and quality assurance, as well as personnel costs (including stock-based compensation) related to project service agreements. Cost of revenue also includes indirect costs, such as inventory valuation reserves, adverse purchase commitments, allocation of facility costs, amortization of developed technology, warranty and other general overhead costs.

Research and Development

Research and development costs are expensed as incurred and consist primarily of personnel costs, product development costs, outside services, costs of development for software and hardware tools, costs and amortization of licensing intellectual property from third parties for product development, costs of fabrication of masks for prototype products, equipment expenses, depreciation of equipment and tools and allocation of facility costs.

Selling, General and Administrative

Selling, general and administrative expenses consist of personnel costs, travel and trade show costs, legal expenses, amortization of trade name and customer relationships, professional services and occupancy costs. Advertising expenses were not material for the fiscal years ended January 31, 2023, 2022 and 2021, respectively.

Stock-Based Compensation

The Company measures stock-based compensation for equity awards granted to employees and directors based on the estimated fair value on the grant date, and recognizes that compensation as expense using the straight-line attribution method for service condition awards or using the graded-vesting attribution method for awards with performance conditions over the requisite service period, which is typically the vesting period of each award. The Company determines the fair value of restricted stock and restricted stock units with service or performance conditions based on the fair market value of its ordinary shares on the grant date. The Company uses the Black-Scholes option pricing model to determine the fair value of stock options. Determining the fair value of stock options on the grant date requires the input of various assumptions, including stock price of the underlying ordinary share, the exercise price of the stock option, expected volatility, expected term, risk-free interest rate and dividend rate. The Company calculates expected volatility based on its own historical stock price for a period commensurate with the expected term, which is computed based on its own historical exercise behavior. The risk-free interest rate is derived from an average of the U.S. Treasury constant maturity rates for the respective periods most closely commensurate with the expected term. The expected dividend yield is zero because the Company has not historically paid dividends and has no present intention to pay dividends. The Company uses the Lattice pricing model and Monte Carlo Simulations to evaluate the fair value of awards with market conditions, including assumptions of historical volatility and risk-free interest rate commensurate with the vesting term. The Company elects to account for forfeitures as they occur.

Income Taxes

The Company records income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in its financial statements or tax returns. In estimating future tax consequences, generally all expected future events other than enactments or changes in the tax law or rates are considered. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount expected to be realized.

The Company applies authoritative guidance for the accounting for uncertainty in income taxes. The guidance requires that tax effects of a position be recognized only if it is “more likely than not” to be sustained based solely on its technical merits as of the reporting date. Upon estimating its tax positions and tax benefits, the Company considers and evaluates numerous factors, which may require periodic adjustments and which may not reflect the final tax liabilities. The Company adjusts its financial statements to reflect only those tax positions that are more likely than not to be sustained under examination.

As part of the process of preparing consolidated financial statements, the Company is required to estimate its taxes in each of the jurisdictions in which it operates. The Company estimates actual current tax exposure together with assessing temporary differences resulting from differing treatment of items, such as accruals and allowances not currently deductible for tax purposes. These differences result in deferred tax assets, which are included in the consolidated balance sheets. In general, deferred tax assets represent future tax benefits to be received when certain expenses previously recognized in the consolidated statements of operations become deductible expenses under applicable income tax laws, or loss or credit carryforwards are utilized.

In assessing whether deferred tax assets may be realized, the Company considers whether it is more likely than not that some portion or all of deferred tax assets will be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income.

The Company makes estimates and judgments about its future taxable income based on assumptions that are consistent with its plans and estimates. Should the actual amounts differ from estimates, the amount of valuation allowance could be materially impacted. Any adjustment to the deferred tax asset valuation allowance would be recorded in the consolidated statements of operations for the periods in which the adjustment is determined to be required.

Net Income (Loss) Per Ordinary Share

Basic earnings (losses) per share is computed by dividing net income (loss) available to ordinary shareholders by the weighted-average number of ordinary shares outstanding during the period. Diluted earnings (losses) per share is computed by dividing net income (loss) available to ordinary shareholders by the weighted-average number of ordinary shares outstanding during the period increased to include the number of additional ordinary shares that would have been outstanding if the potentially dilutive securities had been issued. Potentially dilutive securities include outstanding stock options, shares to be purchased under the Company’s employee stock purchase plan and unvested restricted stock units. The dilutive effect of potentially dilutive securities is reflected in diluted earnings (losses) per share by application of the treasury stock method.

Comprehensive Loss

Comprehensive loss includes unrealized gains or losses from available-for-sale securities that are excluded from net loss.

Recent Accounting Pronouncements

Although there are several new accounting pronouncements issued by the FASB in fiscal year 2023, the Company does not believe any of these accounting pronouncements had or will have a material impact on its consolidated financial statements.

2. Business Combination

The Company did not enter into any business combination agreements during the fiscal years ended January 31, 2023 and 2021. The Company acquired the following business during the fiscal year ended January 31, 2022 which was accounted for as a business combination:

On November 5, 2021, pursuant to a merger agreement, the Company completed the 100% voting rights acquisition of Oculii Corp., or Oculii, a privately-held Ohio-based company that develops adaptive radar perception algorithms for automotive, including advanced driver assistance systems, autonomous vehicle driving systems and other commercial applications, for a total purchase consideration of \$355.7 million. As a result, there was \$277.0 million attributed to goodwill, \$32.8 million attributed to intangible assets and \$45.9 million attributed to net assets acquired. The Company also assumed all of the unvested options to purchase Oculii capital stock that were held by continuing Oculii service providers, subject to customary adjustments with respect to the exercise price and number of shares underlying such options. The acquisition-related costs included in selling, general and administrative expense in the consolidated statements of operations were approximately \$3.8 million in fiscal year 2022.

The aggregate purchase consideration has been allocated as follows:

	<u>Amount</u> <u>(in thousands)</u>
Cash consideration transferred	\$ 355,071
Net working capital adjustment	247
Fair value of stock-based compensation awards attributable to pre-combination services	407
Total purchase consideration	\$ 355,725

The following table sets forth the fair values of the assets acquired and liabilities assumed in connection with the acquisition:

	<u>Acquisition Date</u> <u>Fair Value</u> <u>(in thousands)</u>
Cash and cash equivalents	\$ 48,032
Accounts receivable	733
Inventories	194
Prepaid expenses and other current assets	134
Property and equipment	155
Intangible assets	32,800
Goodwill	277,024
Other non-current assets	34
Total assets acquired	359,106
Accounts payable	223
Accrued and other current liabilities	2,193
Deferred income tax liability, non-current	965
Total liabilities assumed	3,381
Total purchase consideration	\$ 355,725

Goodwill is primarily attributable to expected synergies for the combined operations and the assembled workforce acquired and is assigned to the Company's sole reportable segment.

Below is a summary of intangible assets acquired in the acquisition:

	<u>Acquisition Date Fair Value</u> (in thousands)	<u>Estimated Useful Lives</u>
Trade name (1)	\$ 2,500	7 years
Customer relationships (2)	13,200	9 years
Developed technology (1)	17,100	7 years
Total intangible assets acquired	<u>\$ 32,800</u>	

- (1) The fair values of trade name and developed technology were determined by applying the Relief-from-Royalty Method under the income approach.
- (2) Customer relationships represent the fair value of the existing relationships using the Multi-Period Excess Earnings Method.

The finite-lived intangible assets will be amortized over the estimated useful lives based on the pattern in which the economic benefits are expected to be received to the cost of revenue and operating expenses and have a weighted average useful life of 7.8 years.

Pro Forma Information (Unaudited)

The following table presents unaudited pro forma information as if the acquisition of Oculii had occurred on February 1, 2020. The unaudited pro forma information for the periods indicated includes adjustments for non-recurring transaction costs, amortization of intangibles arising from the acquisition, stock-based compensation expense and the related income tax effects. The unaudited pro forma financial information is not necessarily indicative of the results of operations that would have occurred had the acquisition been effected on February 1, 2020. In addition, these results are not intended to be a projection of future results and do not reflect events that may occur after the acquisition, including but not limited to revenue enhancements, cost savings or operating synergies that the combined entity may achieve as a result of the acquisition.

	<u>Pro Forma Year Ended</u>			
	<u>January 31, 2022</u>		<u>January 31, 2021</u>	
	(unaudited, in thousands)			
Revenue	\$	333,323	\$	223,497
Net loss	\$	(35,330)	\$	(78,644)

Approximately \$0.5 million of revenue and \$6.1 million of net loss attributable to Oculii since the acquisition date of November 5, 2021 was included in the consolidated statements of operations for the fiscal year ended January 31, 2022.

3. Financial Instruments and Fair Value

In the second quarter of fiscal year 2023, the Company resumed its investments in money market funds and debt securities after a full liquidation of its investments in fiscal year 2022 to finance the acquisition of Oculii. The debt security investment portfolio consists of commercial paper, debt securities of corporations or corporate bonds, asset-backed securities and U.S. government securities. All of the investments are denominated in United States dollars and reported at fair value as available-for-sale securities in the consolidated balance sheets as follows:

	As of January 31, 2023			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
Money market funds	\$ 7,872	\$ —	\$ —	\$ 7,872
Commercial paper	18,333	—	—	18,333
Corporate bonds	23,472	50	(224)	23,298
Asset-backed securities	18,753	44	(149)	18,648
U.S. government securities	33,256	22	(235)	33,043
Total cash equivalents and marketable debt securities	<u>\$ 101,686</u>	<u>\$ 116</u>	<u>\$ (608)</u>	<u>\$ 101,194</u>

	As of January 31, 2022			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
Money market funds	\$ 20	\$ —	\$ —	\$ 20
Total cash equivalents and marketable debt securities	<u>\$ 20</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 20</u>

As of January 31, 2023, there were no money market funds or debt securities with unrealized losses for more than twelve months.

	As of	
	January 31, 2023	January 31, 2022
	(in thousands)	
Included in cash equivalents	\$ 7,872	\$ 20
Included in marketable debt securities	93,322	—
Total cash equivalents and marketable debt securities	<u>\$ 101,194</u>	<u>\$ 20</u>

The contractual maturities of the investments at January 31, 2023 and 2022 were as follows:

	As of	
	January 31, 2023	January 31, 2022
	(in thousands)	
Due within one year	\$ 48,016	\$ 20
Due in 1-5 years	52,414	—
Due in 5-7 years	764	—
Total cash equivalents and marketable debt securities	<u>\$ 101,194</u>	<u>\$ 20</u>

The unrealized gains and losses on the available-for-sale securities were primarily caused by fluctuations in market value and interest rates as a result of the economic environment. In accordance with ASU No. 2016-13, Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, the Company estimates the expected losses at an individual security level whenever a security's fair value is below its amortized cost basis using the discounted cash flow method. The credit-related portion of the loss is recognized in other income, net in the consolidated statements of operations but is limited to the difference between the fair value and the amortized cost basis of the security, adjusted for accrued interest. The non-credit-related portion of the loss is recognized in accumulated other comprehensive loss in the consolidated balance sheets. The credit-related losses were not material for the fiscal years ended January 31, 2023, 2022 and 2021, respectively.

Interest income, including amortization of premiums and accretion of discounts related to the investments, as well as realized gains and losses from sales of the investments are recorded in other income, net, in the consolidated statements of operations. For the fiscal years ended January 31, 2023, 2022, and 2021, interest income and realized gains and losses, net, were approximately \$1.7 million, \$1.7 million and \$3.6 million, respectively.

The following fair value hierarchy is applied for disclosure of the inputs used to measure fair value. This hierarchy prioritizes the inputs into three broad levels as follows:

Level 1—Inputs are unadjusted quoted prices in active markets for identical assets or liabilities.

Level 2—Inputs are quoted prices for similar assets and liabilities in active markets or inputs that are observable for the assets or liabilities, either directly or indirectly through market corroboration, for substantially the full term of the financial instruments.

Level 3—Unobservable inputs based on the Company's own assumptions used to measure assets and liabilities at fair value. The inputs require significant management judgment or estimation.

The Company measures the fair value of money market funds using quoted prices in active markets for identical assets and classifies them within Level 1. The fair value of the Company's investments in other debt securities are obtained based on quoted prices for similar assets in active markets and are classified within Level 2.

The following tables present the fair value of the financial instruments measured on a recurring basis as of January 31, 2023 and 2022, respectively:

	As of January 31, 2023			
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Money market funds	\$ 7,872	\$ 7,872	\$ —	\$ —
Commercial paper	18,333	—	18,333	—
Corporate bonds	23,298	—	23,298	—
Asset-backed securities	18,648	—	18,648	—
U.S. government securities	33,043	—	33,043	—
Total cash equivalents and marketable debt securities	<u>\$ 101,194</u>	<u>\$ 7,872</u>	<u>\$ 93,322</u>	<u>\$ —</u>

	As of January 31, 2022			
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Money market funds	\$ 20	\$ 20	\$ —	\$ —
Total cash equivalents and marketable debt securities	<u>\$ 20</u>	<u>\$ 20</u>	<u>\$ —</u>	<u>\$ —</u>

4. Inventories

Inventories at January 31, 2023 and 2022 consisted of the following:

	As of January 31,	
	2023	2022
	(in thousands)	
Work-in-progress	\$ 26,023	\$ 25,844
Finished goods	14,463	19,375
Total	<u>\$ 40,486</u>	<u>\$ 45,219</u>

5. Property and Equipment, net

Depreciation expense was approximately \$3.9 million, \$2.8 million and \$2.6 million for the fiscal years ended January 31, 2023, 2022 and 2021, respectively. Property and equipment at January 31, 2023 and 2022 consisted of the following:

	As of January 31,	
	2023	2022
	(in thousands)	
Computer hardware and software	\$ 20,733	\$ 16,488
Tools and equipment	8,325	7,532
Furniture and fixtures	1,311	1,243
Leasehold improvements	3,295	2,942
Construction in progress	513	1,060
	<u>34,177</u>	<u>29,265</u>
Less: accumulated depreciation and amortization	(22,363)	(19,131)
Total property and equipment, net	<u>\$ 11,814</u>	<u>\$ 10,134</u>

6. Intangible Assets, net

Intangible assets primarily consist of software licenses as well as developed technology, customer relationships and trade name that were acquired from business combinations. In fiscal year 2022, the Company determined that the underlying project incorporating IPR&D from the prior acquisition of VisLab S.r.l., or VisLab, was completed. As a result, the \$4.1 million of IPR&D was reclassified as definite-lived developed technology and started amortization over its estimated economic life of 7 years.

The Company enters into certain software license agreements with third parties from time-to-time. The software licenses consist of noncancelable on-premise internal-use software and software with alternative use that is to be sold, leased or otherwise marketed as part of a product. The licenses have been capitalized as intangible assets, and the corresponding future payments have been recorded as liabilities at net present value. As of January 31, 2023, \$7.1 million was recorded in accrued and other current liabilities and \$9.6 million was recorded in other long-term liabilities in the consolidated balance sheets.

The components of intangible assets as of January 31, 2023 and 2022 were as follows:

	As of January 31, 2023			As of January 31, 2022		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
	(in thousands)					
Software licenses	\$ 34,128	\$ (6,319)	\$ 27,809	\$ 22,093	\$ (11,331)	\$ 10,762
Developed technology	21,200	(3,932)	17,268	21,200	(904)	20,296
Customer relationships	13,200	(1,833)	11,367	13,200	(367)	12,833
Trade name	2,500	(447)	2,053	2,500	(89)	2,411
Total intangible assets, net	<u>\$ 71,028</u>	<u>\$ (12,531)</u>	<u>\$ 58,497</u>	<u>\$ 58,993</u>	<u>\$ (12,691)</u>	<u>\$ 46,302</u>

During the twelve months ended January 31, 2023, there were approximately \$24.5 million of software licenses purchased and approximately \$12.5 million of software licenses retired. The amortization expense associated with software licenses was approximately \$7.5 million, \$6.4 million and \$6.5 million for the fiscal years ended January 31, 2023, 2022 and 2021 respectively. The amortization expense associated with acquisition-related intangible assets, including developed technology, customer relationship and trade name, was approximately \$4.9 million and \$1.4 million for the fiscal years ended January 31, 2023 and 2022, respectively. There was no amortization expense associated with acquisition-related intangible assets for the fiscal year ended January 31, 2021. The expected future amortization expense related to these intangible assets as of January 31, 2023 is as follows:

Fiscal Year	As of
	January 31, 2023
	(in thousands)
2024	\$ 13,754
2025	11,996
2026	9,944
2027	5,711
2028	5,711
Thereafter	11,381
Total future amortization expenses:	<u>\$ 58,497</u>

Intangible assets are tested for impairment at least annually, in the fourth fiscal quarter, or more frequently if events or changes in circumstances indicate that the assets may be impaired. The Company is also required to test the impairment prior to changing the IPR&D from an indefinite-lived asset to a finite-lived asset. There were no intangible asset impairments for the fiscal years ended January 31, 2023, 2022 and 2021, respectively.

7. Goodwill

The Company has one reporting segment and accordingly, there is no goodwill assignment based on reporting units (refer to Note 16). As of January 31, 2023 and 2022, the total carrying amount of goodwill was \$303.6 million, respectively. The Company does not amortize goodwill. In the fourth quarter of fiscal year 2023, 2022 and 2021, the Company performed annual goodwill tests and there were no goodwill impairments for the fiscal years ended January 31, 2023, 2022 and 2021, respectively.

8. Accrued and Other Current Liabilities

Accrued and other current liabilities at January 31, 2023 and 2022 consisted of the following:

	As of January 31,	
	2023	2022
	(in thousands)	
Accrued employee compensation	\$ 22,152	\$ 30,044
Accrued product development costs	19,433	10,523
Software license liabilities, current	7,059	6,001
Other accrued liabilities	8,011	5,496
Total accrued and other current liabilities	<u>\$ 56,655</u>	<u>\$ 52,064</u>

The timing of SoC development progress and payments to outside foundries resulted in fluctuation in the accrued product development costs. Approximately \$10.9 million of annual bonus was paid in fiscal year 2023, of which \$3.2 million was paid in cash and \$7.7 million was settled with restricted stock units.

9. Leases

The Company enters into various operating leases for its worldwide facilities.

During the twelve months ended January 31, 2023, the Company extended leases for its Shenzhen office and one of its facilities in Santa Clara, California for an additional two years beginning October 1, 2022 to September 30, 2024. For the lease extensions, the Company recorded an increase to the operating lease ROU assets and corresponding operating lease liabilities of approximately \$0.8 million in the consolidated balance sheets.

During the twelve months ended January 31, 2022, the Company extended its existing Shanghai office lease for an additional three years beginning December 1, 2021 to November 30, 2024 and extended its existing Hong Kong office lease for an additional five years beginning December 1, 2021 to November 30, 2026. The Company also leased an additional space for its Shanghai office for a period of 40 months starting from August 1, 2021 through November 30, 2024. The Company recorded an aggregate increase of approximately \$4.4 million to the operating lease ROU assets and corresponding operating lease liabilities in the consolidated balance sheets as a result of these lease extensions and additional leased space.

For the fiscal years ended January 31, 2023, 2022 and 2021, the operating lease expense was approximately \$3.7 million, \$3.5 million and \$3.0 million, respectively. The Company's short-term leases and finance leases were immaterial as of January 31, 2023 and 2022, respectively.

Supplemental cash flow information related to the operating leases is as follows:

	Year Ended	
	January 31, 2023	January 31, 2022
	(in thousands)	
Cash paid for operating leases included in operating cash flows	\$ 4,011	\$ 3,608
Supplemental non-cash information related to lease liabilities arising from obtaining right-of-use assets	\$ 319	\$ 365
Leased assets changes arising from lease modifications	\$ 575	\$ 2,798

As of January 31, 2023, the weighted average remaining lease term is 2.61 years, and the weighted average discount rate is 3.58%. Future minimum lease payments for the lease liabilities are as follows:

<u>Fiscal Year</u>	<u>As of</u> <u>January 31, 2023</u>	
	(in thousands)	
2024	\$	3,766
2025		3,420
2026		1,370
2027		299
2028		125
Thereafter		—
Total future annual minimum lease payments		<u>8,980</u>
Less: interest		(344)
Total lease liabilities	\$	<u><u>8,636</u></u>

10. Other Long-Term Liabilities

Other long-term liabilities at January 31, 2023 and 2022 consisted of the following:

	<u>As of January 31,</u>	
	<u>2023</u>	<u>2022</u>
	(in thousands)	
Unrecognized tax benefits, including interest	\$ 3,770	\$ 9,313
Deferred tax liabilities, non-current	1,120	1,769
Software license liabilities, non-current	9,614	1,674
Other long-term liabilities	1,044	7
Total other long-term liabilities	<u>\$ 15,548</u>	<u>\$ 12,763</u>

11. Capital Stock

Preference shares

Since the Company's initial public offering, or IPO, a total of 20,000,000 preference shares, with a \$0.00045 par value per share, were authorized. There were no preference shares issued and outstanding as of January 31, 2023 and 2022, respectively.

Ordinary shares

As of January 31, 2023 and 2022, the following ordinary shares were reserved for future issuance under the Company's equity plans and employee stock purchase plan:

	<u>As of January 31,</u>	
	<u>2023</u>	<u>2022</u>
Shares reserved for options, restricted stock and restricted stock units under equity plans	5,822,819	7,461,541
Shares reserved for employee stock purchase plan	2,986,403	2,624,704

Shares repurchased

There were no shares repurchased in fiscal years 2023 and 2022. On March 16, 2020, the Company repurchased a total of 25,719 of its ordinary shares for approximately \$1.0 million in cash under an authorized repurchase program up to \$50.0 million. The Company's Board of Directors has approved extensions of the repurchase program through June 30, 2023. As of January 31, 2023, there was approximately \$49.0 million available for repurchases through June 30, 2023. Repurchases under the program may be made from time-to-time through open market purchases, 10b5-1 plans or privately negotiated transactions subject to market conditions, applicable legal requirements and other relevant factors. The repurchase program does not obligate the Company to acquire any particular amount of ordinary shares, and it may be suspended at any time at the company's discretion. Repurchases are funded using working capital and any repurchased shares are recorded as authorized but unissued shares.

12. Employee Benefits and Stock-based Compensation

401(k) Plan

The Company maintains a defined contribution 401(k) plan (the 401(k) Plan) for all of its eligible U.S. employees. Under the 401(k) Plan, eligible employees may contribute up to the Internal Revenue Service annual contribution limitation. The Company is responsible for administrative costs of the Plan. The Company's contribution expense for the fiscal years ended January 31, 2023 and 2022 was approximately \$0.8 million and \$0.6 million, respectively. The Company did not make any matching contributions prior to fiscal year 2022.

Stock Option Plans

2012 Equity Incentive Plan. The 2012 Equity Incentive Plan, or 2012 EIP, permits the grant of ISOs, within the meaning of Section 422 of the Code, to employees of the Company and any of the Company's subsidiary corporations, and the grant of NSOs, stock appreciation rights, restricted stock, restricted stock units, performance units, performance shares, deferred stock units and dividend equivalents to employees, directors and consultants of the Company and any of the Company's subsidiary corporations' employees and consultants.

2021 Equity Incentive Plan. In June 2021, the Company's shareholders approved the 2021 Equity Incentive Plan, or 2021 EIP. The 2021 EIP permits the grant of ISOs, within the meaning of Section 422 of the Code, to employees of the Company and any of the Company's subsidiary or parent corporations, and the grant of NSOs, stock appreciation rights, restricted stock, restricted stock units, and performance awards to employees, directors and consultants of the Company and any of the Company's subsidiary or parent corporations' employees and consultants. Upon adoption of the 2021 EIP, the total number of ordinary shares of the Company reserved for issuance under the 2021 Plan was equal to, subject to adjustments upon changes in capitalization as provided under the 2021 EIP, 1,350,000 ordinary shares, plus (i) any ordinary shares subject to outstanding awards granted under the 2012 EIP, that, after the date the 2012 EIP is terminated, are cancelled, expire or otherwise terminate without having been exercised in full or are forfeited to or repurchased by the Company due to failure to vest, and (ii) any ordinary shares that, as of immediately prior to the termination of the 2012 EIP, were available for grant under the 2012 EIP, up to a maximum of 6,834,208 ordinary shares pursuant to clauses (i) and (ii).

In the first quarter of fiscal year 2022, the Company added 1,599,634 shares to the ordinary shares reserved for issuance, pursuant to an "evergreen" provision contained in the 2012 EIP. Upon the approval of the 2021 EIP, the 2012 EIP was terminated. No additional awards will be granted under the 2012 EIP and any shares that were reserved but not issued under the 2012 EIP became available for future grant or sale under the 2021 EIP. However, all outstanding stock options and other awards previously granted under the 2012 EIP will remain subject to the terms of the 2012 EIP.

Oculii Corp. 2017 Stock Option Plan. In November 2021, the Company assumed the Oculii Corp. 2017 Stock Option Plan, or 2017 Plan, as part of the acquisition of Oculii. No additional awards will be granted under the 2017 Plan. However, all outstanding stock options previously granted under the 2017 Plan will remain subject to the terms of the 2017 Plan and any outstanding stock options that are cancelled or forfeited due to failure to vest will immediately expire from the 2017 Plan.

The exercise price of ISOs granted to a holder of more than 10% of the voting power of all classes of the Company's shares shall be no less than 110% of fair market value on the grant date. The exercise price of ISOs granted to other employees and NSOs shall be no less than 100% of fair market value on the grant date. Options granted under the Plan have a term of up to 10 years from grant date. Options granted to new employees generally vest 25% on the first anniversary service date of the grant and the remainder vest ratably over the following 36 months.

Restricted stock and restricted stock units granted to new employees generally vest as to 1/4th of the shares on the first anniversary service date of the grant and 1/16th of the shares vest every 3 months thereafter, so as to be 100% vested on the fourth anniversary of the vesting commencement date.

Vesting schedules for other service condition, market condition or performance condition awards vary and are subject to approval by the Board of Directors; provided that the performance condition associated awards shall not vest at all until the performance conditions are achieved and are subject to the award's holders continuing to provide services to the Company through such vesting dates. The performance condition awards are automatically forfeited in their entirety, without any cost to or action by the Company, if there has been no achievement of the performance. The holders of restricted stock have voting power and other rights with respect to such shares, provided, however, that such shares are held in escrow and subject to forfeiture until the shares vested.

Amended and Restated 2012 Employee Stock Purchase Plan. The Amended and Restated 2012 Employee Stock Purchase Plan, or ESPP, permits eligible participants to purchase ordinary shares at a discount through contributions up to 15% of their eligible compensation, subject to any IRS limitations. The ESPP provides each offering and purchasing period of six months in duration. The purchase price is 85% of the lower of the closing price of the Company’s ordinary shares on the first trading day of each offering period or on the purchase date.

In the first quarter of fiscal year 2023 and 2022, the Company added 466,285 and 444,343 shares, respectively, to the ordinary shares reserved for issuance, pursuant to an “evergreen” provision contained in the ESPP. Pursuant to such provision, on February 1st of each fiscal year, the number of ordinary shares reserved for issuance under the ESPP is automatically increased by a number equal to the lesser of (i) 1,500,000 ordinary shares, (ii) one and one quarter percent (1.25%) of the aggregate number of ordinary shares outstanding on such date, or (iii) an amount determined by the Company’s Board of Directors or a duly authorized committee of the Board of Directors.

Stock-based Compensation

The following table presents the classification of stock-based compensation for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands)		
Stock-based compensation:			
Cost of revenue	\$ 3,597	\$ 1,489	\$ 1,328
Research and development	71,236	54,787	42,903
Selling, general and administrative	36,325	31,525	25,903
Total stock-based compensation	<u>\$ 111,158</u>	<u>\$ 87,801</u>	<u>\$ 70,134</u>

As of January 31, 2023 and 2022, approximately \$4.6 million and \$7.8 million of stock-based compensation expense, respectively, was accrued in accrued and other current liabilities in the consolidated balance sheets. Total unrecognized compensation cost related to unvested stock options at January 31, 2023 was \$15.9 million and is expected to be recognized over a weighted-average period of 1.85 years. Total unrecognized compensation cost related to unvested restricted stock units was \$189.7 million and is expected to be recognized over a weighted-average period of 2.41 years. In April 2022, the Company’s Compensation Committee of the Board of Directors approved the acceleration of vesting of 35,703 shares of unvested equity awards associated with the departure of Mr. Casey Eichler, who was the Company’s Chief Financial Officer until March 2022. As a result, there was approximately \$1.7 million of additional stock-based compensation expense, net recognized in fiscal year 2023.

The following table sets forth the weighted-average assumptions used to estimate the fair value of stock options and employee stock purchase plan awards for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
Stock Options:			
Volatility	—	51%	52%
Risk-free interest rate	—	1.04%	0.52%
Expected term (years)	—	5.06	5.78
Dividend yield	—	0%	0%
Employee stock purchase plan awards:			
Volatility	81%	57%	59%
Risk-free interest rate	2.32%	0.06%	0.21%
Expected term (years)	0.5	0.5	0.5
Dividend yield	0%	0%	0%

The following table summarizes stock option activities for the periods indicated:

	Option Outstanding						
	Shares	Weighted-Average Exercise Price	Weighted-Average Grant-date Fair Value	Weighted-Average Acquisition-date Fair Value	Total Intrinsic Value of options Exercised	Weighted-Average Remaining Contractual Term	Aggregate Intrinsic Value
					(in thousands)	(in years)	(in thousands)
Outstanding at January 31, 2020	1,124,646	\$ 32.93					
Granted	51,200	59.54	\$ 28.37				
Exercised	(421,736)	24.52			\$ 19,401		
Forfeited	(11,618)	46.69					
Expired	(23,349)	70.11					
Outstanding at January 31, 2021	719,143	38.33					
Granted	14,700	110.19	\$ 50.28				
Assumed	163,581	23.10		\$ 173.04			
Exercised	(269,287)	28.23			\$ 25,622		
Forfeited	(7,669)	68.95					
Expired	(1,146)	9.86					
Outstanding at January 31, 2022	619,322	40.08					
Exercised	(121,624)	30.34			\$ 6,712		
Forfeited	(10,618)	55.97					
Expired	(2,289)	39.19					
Outstanding at January 31, 2023	484,791	42.18				4.38	\$ 23,346
Exercisable at January 31, 2023	370,158	\$ 44.47				3.59	\$ 16,927

The intrinsic value of options outstanding and exercisable is calculated based on the difference between the fair market value of the Company's ordinary shares on the reporting date and the exercise price. The closing price of the Company's stock was \$89.84 on January 31, 2023, as reported by The NASDAQ Global Market. The intrinsic value of exercised options is calculated based on the difference between the fair market value of the Company's stock on the exercise date and the exercise price.

The following table summarizes restricted stock unit activities for the periods indicated:

	Shares	Weighted-Average Grant-Date Fair Value
Unvested at January 31, 2020	2,617,266	\$ 50.30
Granted	1,499,203	53.45
Vested	(1,162,883)	50.53
Forfeited	(81,785)	54.48
Unvested at January 31, 2021	2,871,801	51.73
Granted	1,213,257	128.80
Vested	(1,367,309)	53.85
Forfeited	(66,614)	71.59
Unvested at January 31, 2022	2,651,135	85.41
Granted	1,549,174	74.45
Vested	(1,513,972)	71.32
Forfeited	(112,978)	99.46
Unvested at January 31, 2023	2,573,359	\$ 86.81

Total fair value as of the respective vesting dates of restricted stock units vested for the fiscal years ended January 31, 2023, 2022 and 2021 was approximately \$122.0 million, \$192.5 million, and \$69.0 million, respectively. As of January 31, 2023, the aggregate intrinsic value of unvested restricted stock units was \$231.2 million.

13. Net Loss Per Ordinary Share

The following table sets forth the computation of basic and diluted net loss per ordinary share for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands, except share and per share data)		
Numerator:			
Net loss	\$ (65,386)	\$ (26,411)	\$ (59,786)
Denominator:			
Weighted-average ordinary shares - basic	38,363,638	36,577,120	34,679,717
Weighted-average ordinary shares - diluted	38,363,638	36,577,120	34,679,717
Net loss per ordinary share:			
Basic	\$ (1.70)	\$ (0.72)	\$ (1.72)
Diluted	\$ (1.70)	\$ (0.72)	\$ (1.72)

The following weighted-average potentially dilutive securities were excluded from the computation of diluted net loss per ordinary share as their effect would have been antidilutive:

	Year Ended January 31,		
	2023	2022	2021
Options to purchase ordinary shares	336,828	327,747	660,025
Restricted stock units	1,550,679	1,388,091	1,440,176
Employee stock purchase plan	10,883	8,904	27,789
	<u>1,898,390</u>	<u>1,724,742</u>	<u>2,127,990</u>

14. Income Taxes

Loss before income taxes consisted of the following for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands)		
U.S. operations	\$ (18,968)	\$ (5,842)	\$ 8
Non-U.S. operations	(51,970)	(22,799)	(57,311)
Loss before income taxes	<u>\$ (70,938)</u>	<u>\$ (28,641)</u>	<u>\$ (57,303)</u>

Income tax provision (benefit) consisted of the following for the periods indicated:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands)		
Current:			
U.S. federal tax	\$ (3,525)	\$ 907	\$ 1,705
U.S. state taxes	175	—	256
Non-U.S. foreign taxes	2,395	1,778	1,019
	<u>(955)</u>	<u>2,685</u>	<u>2,980</u>
Deferred:			
U.S. federal tax	(4,231)	(4,819)	(432)
U.S. state taxes	—	(14)	—
Non-U.S. foreign taxes	(366)	(82)	(65)
	<u>(4,597)</u>	<u>(4,915)</u>	<u>(497)</u>
Provision (benefit) for income taxes	<u>\$ (5,552)</u>	<u>\$ (2,230)</u>	<u>\$ 2,483</u>

The Company consists of a Cayman Islands parent company with various foreign and U.S. subsidiaries. Effective December 31, 2019, the Company has structured its activities to comply with the International Tax Co-Operation (Economic Substance) Law, 2018 in the Cayman Islands. As part of the new structure, the Company is the general partner of a Canadian limited partnership, the ultimate beneficial owner, and is allocated all of the earnings of the partnership. The primary jurisdiction where our foreign earnings are derived is the Cayman Islands, where the Company is domiciled. Under the current laws of the Cayman Islands, the Company is not subject to tax on its income. For purposes of the reconciliation between the provision (benefit) for income taxes at the statutory rate and the effective tax rate, a notional U.S. 21% rate is applied to pretax income (loss) as a result of the following for the periods indicated, respectively:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands)		
Provision at U.S. notional statutory rate	\$ (14,897)	\$ (6,015)	\$ (12,034)
U.S. state taxes	114	(11)	212
Non-U.S. foreign tax differential	12,943	6,483	12,989
Stock-based compensation	10,004	1,900	4,943
U.S. R&D credit	(5,045)	(5,886)	(3,928)
Valuation allowance	2,124	765	—
FIN48 interest	(739)	311	—
Uncertain tax position release	(10,188)	—	—
Other	132	223	301
Provision (benefit) for income taxes	<u>\$ (5,552)</u>	<u>\$ (2,230)</u>	<u>\$ 2,483</u>

Temporary differences that gave rise to significant portions of the Company's deferred tax assets and liabilities at January 31, 2023 and 2022 were as follows:

	As of January 31,	
	2023	2022
	(in thousands)	
Deferred tax assets:		
Federal and state credits	\$ 40,134	\$ 33,485
Net operating losses	6,659	7,466
Expenses not currently deductible	3,164	1,294
Operating lease liabilities	1,582	2,096
Stock-based compensation	3,678	3,632
Foreign deferred	262	191
Gross deferred tax assets	<u>55,479</u>	<u>48,164</u>
Valuation allowance	<u>(28,596)</u>	<u>(24,083)</u>
Total deferred tax assets	<u>\$ 26,883</u>	<u>\$ 24,081</u>
Deferred tax liabilities		
Intangible assets	(6,782)	(8,150)
Property and equipment	(617)	(386)
Operating lease assets	(1,452)	(1,971)
Net deferred tax assets	<u>\$ 18,032</u>	<u>\$ 13,574</u>

Tax valuation allowance for the periods indicated below were as follows:

	Balance at Beginning of Period	Additional Charged to Expenses	Additions Charged to Other Account	Deductions Charged to Expenses or Other Accounts	Balance at End of Period
	(in thousands)				
Tax Valuation Allowance					
Year ended January 31, 2023	\$ 24,083	4,513	—	—	\$ 28,596
Year ended January 31, 2022	\$ 17,962	4,874	1,247	—	\$ 24,083
Year ended January 31, 2021	\$ 14,670	3,292	—	—	\$ 17,962

The Company conducts its business in several countries and regions and is subject to taxation in those jurisdictions. The Company is incorporated in the Cayman Islands with foreign subsidiaries in the U.S., China, Taiwan, Italy and other foreign countries and regions. As such, the Company's worldwide operating income is subject to varying tax rates and its effective tax rate is highly dependent upon the geographic distribution of its earnings or losses and the tax laws and regulations in each geographical region. Consequently, the Company has experienced lower effective tax rates as a substantial amount of its operations are conducted in lower-tax jurisdictions. If the Company's operational structure was to change in such a manner that would increase the amount of operating income subject to taxation in higher-tax jurisdictions, or if the Company was to commence operations in jurisdictions assessing relatively higher tax rates, its effective tax rate could fluctuate significantly on a quarterly basis and/or be adversely affected. Dividend distributions received from the Company's U.S. subsidiary and certain other foreign subsidiaries may be subject to local country withholding taxes when, and if, distributed. Deferred tax liabilities have not been recorded on unremitted earnings of certain subsidiaries because management's intent is to indefinitely reinvest any undistributed earnings in those subsidiaries. If dividend distributions from those subsidiaries were to occur, the liability as of January 31, 2023 would be \$15.6 million. Cumulative undistributed earnings of foreign subsidiaries for which no deferred taxes have been provided approximated \$107.9 million at January 31, 2023.

As of January 31, 2023 and 2022, the Company had deferred tax assets (net of deferred tax liabilities) before valuation allowance, of \$46.6 million and \$37.7 million, respectively. The Company assesses whether a valuation allowance should be established against its deferred tax assets based on the consideration of all available evidence, using a "more likely than not" standard.

The Company has Federal and California net operating losses of \$31.4 million and \$1.0 million, respectively, as of January 31, 2023. The Federal net operating loss carryforwards begin to expire in fiscal year 2037. The California net operating loss carryforwards begin to expire in fiscal year 2040, if not utilized. For financial statement purposes these carry forwards are offset by uncertain tax positions.

The Company also has Federal and California state research and development credit carryforwards of approximately \$27.5 million and \$37.5 million, respectively, at January 31, 2023. The Federal credits begin to expire in fiscal year 2037. The California credits can be carried forward indefinitely.

The Company reports its U.S. state deferred tax assets and related valuation allowance, net of the U.S. federal tax rate of 21%. As of January 31, 2023, the Company has recorded a valuation allowance of \$24.5 million against all of its U.S. state deferred tax assets due to uncertainty regarding the future utilization of these deferred tax assets. In addition, the Company has recorded a valuation allowance of \$4.1 million against the federal deferred tax assets of Oculii Corp.

Utilization of the net operating loss and research credit carryforwards may be subject to an annual limitation due to the ownership percentage change limitations as defined by the U.S. Internal Revenue Code Section 382, as amended, and similar state provisions. The annual limitation may result in the expiration of the U.S. Federal and state research credit carryforwards before utilization. The Company does not expect any net operating loss or tax credit carryforwards to expire as a result of a Section 382 limitation.

The Company applies the provisions of FASB's guidance on accounting for uncertainty in income taxes. As of January 31, 2023, the Company had approximately \$21.7 million in unrecognized tax benefits, \$14.8 million of which would affect the Company's effective tax rate if recognized. The remainder of the unrecognized tax benefits would not affect the effective tax rate due to the full valuation recorded for state deferred tax assets. Certain fiscal year 2021 amounts have been revised to reflect unrecognized tax benefits on a gross basis. The following table sets forth a reconciliation of the beginning and ending amount of unrecognized tax benefits:

	Year Ended January 31,		
	2023	2022	2021
	(in thousands)		
Beginning balance:	\$ 30,884	\$ 29,527	\$ 42,695
Additions based on tax positions related to the current year	1,033	1,412	3,360
Additions for tax positions of prior years	195	55	16
Reductions for tax positions in prior years	(45)	—	(10,212)
Settlements for prior periods	—	—	(6,087)
Lapse of applicable statute of limitations	(10,411)	(110)	(245)
Ending balance:	<u>\$ 21,656</u>	<u>\$ 30,884</u>	<u>\$ 29,527</u>

The Company classified \$3.2 million and \$8.0 million of income tax liabilities as other long-term liabilities as of January 31, 2023 and 2022, respectively, because payment of cash or settlement is not anticipated within one year from the balance sheet date.

The Company recognizes interest and penalties related to uncertain tax positions as a component of income tax expense. The Company recorded a benefit of \$0.7 million, expense of \$0.3 million and expense of \$0.3 million for interest and penalties related to uncertain tax positions for the fiscal years ended January 31, 2023, 2022 and 2021, respectively. The benefit in fiscal year 2023 was due to the release of a prior year reserve upon lapse of statute of limitations. The Company recorded noncurrent liabilities of \$0.6 million and \$1.3 million related to interest and penalties for uncertain tax positions at January 31, 2023 and 2022, respectively.

The primary jurisdiction where our foreign earnings are derived is the Cayman Islands, where the Company is domiciled. The Company files income tax returns in the U.S. federal jurisdiction as well as many U.S. state and foreign jurisdictions. The Internal Revenue Service has closed the examination of the Company's U.S. federal income tax return for the fiscal year ended January 31, 2017. At January 31, 2023, the Company's fiscal year 2020 through 2023 tax years are generally open and subject to potential examination by U.S. federal tax authorities. The Company's fiscal year 2019 through 2023 tax years are generally open and subject to potential examination by state tax authorities. The Company's fiscal years 2016 to 2023 remain open to examination by foreign tax authorities. Fiscal years outside of the normal statute of limitations remain open to audit by tax authorities due to tax attributes generated in those earlier years, which have been carried forward and may be audited in subsequent years when utilized.

The Company regularly assesses the likelihood of adverse outcomes resulting from potential tax examinations to determine the adequacy of its provision for income taxes. These assessments can require considerable estimates and judgments. During the fiscal year ended January 31, 2023, the gross amount of unrecognized tax benefits decreased by \$9.2 million to \$21.7 million. The decrease was primarily due to the release of prior year reserves upon the lapse of the statute of limitations. If the estimates of income tax liabilities prove to be less than the ultimate assessment, then a further charge to expense could be required. If events occur, and the payment of these amounts ultimately proves to be unnecessary, the reversal of the liabilities could result in tax benefits being recognized in the period in which the Company determines the liabilities are no longer necessary. The Company does not anticipate significant changes to its uncertain tax positions during the next twelve months.

As of January 31, 2023, the Company's long-term income taxes payable, including estimated interest and penalties, was approximately \$3.8 million. The Company was unable to make a reasonably reliable estimate of the timing of payments in individual years due to uncertainties in the timing of tax audits, if any, or their outcomes.

On July 27, 2015, the United States Tax Court issued a decision ("Tax Court Decision") in *Altera Corp. v. Commissioner*, which concluded that related parties in a cost sharing arrangement are not required to share expenses related to share-based compensation. The Tax Court Decision was appealed by the Commissioner to the Ninth Circuit Court of Appeals ("Ninth Circuit"). On June 7, 2019, the Ninth Circuit issued an opinion that reversed the Tax Court Decision. On July 22, 2019, the taxpayer requested a rehearing before the full Ninth Circuit and the request was denied on November 12, 2019. On February 10, 2020, the taxpayer filed a petition to appeal the decision with the Supreme Court of the United States which was denied on June 22, 2020. The denial of the request by the Supreme Court did not have a material impact to the Company's provision for income taxes.

15. Commitments and Contingencies

Contract Manufacturer Commitments

The Company's components and products are procured and built by independent contract manufacturers based on sales forecasts. These forecasts include estimates of future demand, historical trends, analysis of sales and marketing activities, and adjustment of overall market conditions. The Company regularly issues purchase orders to independent contract manufacturers which are cancelable upon agreement between the Company and the third-party manufacturers. These manufacturing purchase commitments typically provide the Company with flexibility to cancel, reschedule or adjust requirements based upon business needs but the Company may incur certain costs depending on the production stage of the products. As of January 31, 2023 and 2022, total manufacturing purchase commitments were approximately \$43.6 million and \$71.5 million, respectively. The Company also reviews and assesses the need for any expected loss liabilities on quarterly basis for all products that it does not expect to sell for which it has committed purchases from suppliers. As of January 31, 2023, an approximately \$2.9 million loss was recognized in the consolidated balance sheets from adverse purchase commitments. There were no material loss liabilities recorded in the consolidated balance sheets from adverse purchase commitments as of January 31, 2022.

Indemnification

The Company, from time to time, in the normal course of business, indemnifies certain vendors with whom it enters into contractual relationships. The Company has agreed to hold the other party harmless against third-party claims in connection with the Company's future products. The Company also indemnifies certain customers against third-party claims related to certain intellectual property and product liability matters. It is not possible to determine the maximum potential amount of liability under these indemnification obligations due to the limited history of prior indemnification claims and the unique facts and circumstances that are likely to be involved in each particular claim. The Company has not made payments under these obligations as of January 31, 2023, and no liabilities have been recorded for these obligations in the consolidated balance sheets as of January 31, 2023 and 2022, respectively.

Other Matters

From time to time, the Company is subject to commercial disputes, employment issues, intellectual property claims and litigation, in the ordinary course of its business. Although the ultimate disposition of asserted claims cannot be predicted with certainty, it is the Company's belief that the outcome of any such claims, either individually or on a combined basis, will not have a material adverse effect on its consolidated financial position. The results of any litigation cannot be predicted with certainty, and regardless of the outcome, litigation can have an adverse impact on the Company because of defense and settlement costs, diversion of management resources, and other factors. As of January 31, 2023 and 2022, there were not any accruals for contingent liabilities related to such matters recorded in the consolidated balance sheets.

16. Segment Reporting

The Company operates in one operating and reporting segment related to the development and sales of low-power, HD, Ultra HD video compression, image processing and computer vision solutions. The Chief Executive Officer of the Company has been identified as the Chief Operating Decision Maker (the CODM) and manages the Company's operations as a whole. For the purpose of evaluating financial performance and allocating resources, the CODM reviews financial information presented on a consolidated basis accompanied by information by customer and geographic region.

Geographic Revenue

The following table sets forth the Company's revenue by geographic region based on bill-to location for the periods indicated.

	Year Ended January 31,		
	2023	2022	2021
		(in thousands)	
Taiwan	\$ 203,828	\$ 209,044	\$ 139,327
Asia Pacific	73,371	81,480	57,270
Europe	25,065	17,823	9,415
North America other than United States	23,164	18,191	10,304
United States	12,178	5,318	6,674
Total revenue	<u>\$ 337,606</u>	<u>\$ 331,856</u>	<u>\$ 222,990</u>

Substantially all of the Company's property and equipment were located in the Asia Pacific region, United States and Europe. As of January 31, 2023, the net amount of these fixed assets located in these regions was approximately \$6.3 million, \$4.0 million and \$1.5 million, respectively. As of January 31, 2022, the net amount of these fixed assets located in these regions was approximate \$5.6 million, \$3.1 million and \$1.5 million, respectively.

Major Customers

The customers representing 10% or more of revenue and accounts receivable for the fiscal years ended January 31, 2023, 2022 and 2021 were Wintech and Chicony. For the fiscal years ended January 31, 2023, 2022 and 2021, Wintech accounted for approximately 57%, 62% and 63% of total revenue, respectively. For the fiscal years ended January 31, 2023, 2022 and 2021, Chicony accounted for approximately 12%, 13% and 16% of total revenue, respectively. Accounts receivable with Wintech and Chicony were approximately \$21.0 million and \$9.4 million as of January 31, 2023, respectively. Accounts receivable with Wintech and Chicony were approximately \$23.3 million and \$7.4 million as of January 31, 2022, respectively.

17. Subsequent Event

On March 10, 2023, Silicon Valley Bank (SVB) was closed by the California Department of Financial Protection and Innovation, which appointed the Federal Deposit Insurance Corporation (FDIC) as receiver. At the time of closing, the Company had cash deposits with SVB of approximately \$17.0 million. On March 13, 2023, the Company withdrew all of its cash on deposit with SVB. The Company also has cash equivalents and marketable debt security investments residing in custodial accounts held by U.S. Bank for which SVB Asset Management was the investment advisor until March 15, 2023. The Company's investment portfolio currently does not contain any securities of SVB. The Company holds sufficient liquid assets with other banks to manage its operational needs. Accordingly, the Company does not believe the closure of SVB and appointment of FDIC as receiver have an impact on its business or financial position, but will continue to monitor the situation as it evolves.

ITEM 16. FORM 10-K SUMMARY

None.

EXHIBITS INDEX

Exhibit Number	Description
2.1(2)	Agreement and Plan of Merger, dated October 26, 2021, by and among Ambarella, Inc., Ohio Merger Sub, Inc., Oculii Corp. and Shareholder Representative Services LLC
3.2(3)	Amended and Restated Memorandum of Association and Second Amended and Restated Articles of Association of Ambarella, Inc.
4.1(14)	Description of Share Capital of Ambarella, Inc.
10.2.1(5)*	Amended and Restated 2012 Equity Incentive Plan
10.2.2(3)*	Form of Stock Option Agreement under 2012 Equity Incentive Plan
10.2.3(3)*	Form of Restricted Stock Agreement under 2012 Equity Incentive Plan
10.2.4(3)*	Form of Restricted Stock Unit Agreement under 2012 Equity Incentive Plan
10.2.5(5)*	Form of Performance-Based Restricted Stock Unit Agreement under 2012 Equity Incentive Plan
10.1(1)*	Amended and Restated 2012 Employee Stock Purchase Plan
10.1(6)*	Ambarella, Inc. 2021 Equity Incentive Plan
4.1.2(7)*	Form of Stock Option Agreement under 2021 Equity Incentive Plan
4.1.3(7)*	Form of Restricted Stock Unit Agreement under 2021 Equity Incentive Plan
4.1.1(8)*	Oculii Corp. 2017 Stock Option Plan
4.1.2(8)*	Form of Stock Option Agreement under Oculii Corp. 2017 Stock Option Plan
10.4(3)*	Form of Indemnification Agreement
10.6.1(4)*	Form of Change of Control and Severance Agreement, entered into by Ambarella, Inc. with the Chief Executive Officer, Chief Financial Officer and Chief Technology Officer
10.3(11)*	Form of Amended and Restated Change of Control and Severance Agreement, entered into by Ambarella, Inc. with executive officers other than the Chief Executive Officer, Chief Financial Officer and Chief Technology Officer
10.8.1(9)	Sales Representative Agreement dated January 31, 2011 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.

10.8.2(9)	Amendment No. 1 to Sales Representative Agreement dated February 1, 2012 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.
10.8.3(10)	Amendment No. 2 to Sales Representative Agreement dated October 1, 2012 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.
10.2(1)	Amendment to the Sales Representative Agreement dated August 1, 2015 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.
10.1(12)	Amendment to the Sales Representative Agreement dated June 1, 2019 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.
10.2(15)	Amendment No. 6 to Sales Representative Agreement dated May 1, 2021 by and between Ambarella, Inc. and WT Microelectronics Co., Ltd.
10.1(13)	Standard Lease between Ambarella Corporation and The Realty Associates Fund XI Portfolio, L.P., dated as of August 8, 2019
10.1(16)*	Employment letter entered into by Ambarella Corp. with Brian White, dated March 18, 2022.
10.2(16)*	Change of Control and Severance Agreement entered into by Ambarella Corp. with Brian White, dated March 28, 2022.
10.11(17)*	Description of Executive Bonus Plan for Fiscal Year 2024.
21.1(14)	List of subsidiaries of Ambarella, Inc.
23.1	Consent of PricewaterhouseCoopers LLP, independent registered public accounting firm
24.1	Power of Attorney (included in 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
32.1±	Certification of Principal Executive Officer and Principal Financial Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350
101.INS	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data file because its XBRL tags are embedded within the Inline XBRL document
101.SCH	Inline XBRL Taxonomy Schema Linkbase Document
101.CAL	Inline XBRL Taxonomy Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Labels Linkbase Document
101.PRE	Inline XBRL Taxonomy Presentation Linkbase Document
104	The cover page from the Company’s Annual Report on Form 10-K for the fiscal year ended January 31, 2022, has been formatted in Inline XBRL and included in Exhibit 101

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- (1) Incorporated by reference to the Form 10-Q filed on September 8, 2015.
 - (2) Incorporated by reference to the Form 8-K filed on October 26, 2021.
 - (3) Incorporated by reference to the Form S-1/A (No. 333-174838) filed on September 13, 2012.
 - (4) Incorporated by reference to the Form S-1 (No. 333-174838) filed on June 10, 2011.
 - (5) Incorporated by reference to the Form 10-K filed on March 30, 2017.
 - (6) Incorporated by reference to the Form 8-K filed on June 23, 2021.
 - (7) Incorporated by reference to the Form S-8 (No. 333-261244) filed on November 19, 2021.
 - (8) Incorporated by reference to the Form S-8 (No. 333-261243) filed on November 19, 2021.
 - (9) Incorporated by reference to the Form S-1/A (No. 333-174838) filed on September 26, 2012.
 - (10) Incorporated by reference to the Form S-1/A (No. 333-174838) filed on October 5, 2012.

- (11) Incorporated by reference to the Form 10-Q filed on September 7, 2018.
- (12) Incorporated by reference to the Form 10-Q filed on September 6, 2019.
- (13) Incorporated by reference to the Form 10-Q filed on December 6, 2019.
- (14) Incorporated by reference to the Form 10-K filed on March 27, 2020.
- (15) Incorporated by reference to the Form 10-Q filed on September 8, 2021.
- (16) Incorporated by reference to the Form 10-Q filed on June 8, 2022.
- (17) Incorporated by reference to the Form 8-K filed on March 2, 2023.

* Management contracts or compensation plans or arrangements in which directors or executive officers are eligible to participate ± In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release No. 33-8238 and 34-47986, Final Rule: Management's Reports on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, the certifications furnished in Exhibits 32.1 hereto are deemed to accompany this Form 10-K and will not be deemed "filed" for purposes of Section 18 of the Exchange Act. Such certifications will not be deemed to be incorporated by reference into any filings under the Securities Act or the Exchange Act, except to the extent that the registrant specifically incorporates it by reference.

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, on March 31, 2023.

AMBARELLA, INC.

By: /s/ Brian C. White

Brian C. White, Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Brian C. White as his true and lawful agent, proxy and attorney-in-fact, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to (i) act on, sign, and file with the Securities and Exchange Commission any and all amendments to this Annual Report on Form 10-K, together with all schedules and exhibits thereto, (ii) act on, sign, and file such certificates, instruments, agreements and other documents as may be necessary or appropriate in connection therewith, and (iii) take any and all actions that may be necessary or appropriate to be done, as fully for all intents and purposes as he might or could do in person, hereby approving, ratifying and confirming all that such agent, proxy and attorney-in-fact or any of his 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 and in the capacities and on March 31, 2023.

Signature	Title
/s/ Feng-Ming Wang Feng-Ming Wang	President, Chief Executive Officer, Executive Chairman and Director (Principal Executive Officer)
/s/ Brian C. White Brian C. White	Chief Financial Officer (Principal Financial and Accounting Officer)
/s/ Leslie D. Kohn Leslie D. Kohn	Chief Technical Officer and Director
/s/ Chenming C. Hu Chenming C. Hu	Director
/s/ Christopher B. Paisley Christopher B. Paisley	Director
/s/ D. Jeffrey Richardson D. Jeffrey Richardson	Director
/s/ Hsiao-Wuen Hon Hsiao-Wuen Hon	Director
/s/ Andrew W. Verhalen Andrew W. Verhalen	Director
/s/ Elizabeth M. Schwarting Elizabeth M. Schwarting	Director
/s/ Anne De Greef-Safft Anne De Greef-Safft	Director

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AMBARELLA CORPORATE INFORMATION

EXECUTIVE OFFICERS

Feng-Ming (Fermi) Wang
President & Chief Executive Officer

Leslie Kohn
Chief Technical Officer

Brian White
Chief Financial Officer

Chan Lee
Chief Operating Officer

John Ju
Senior Vice President, Systems

Yun-Lung (Michael) Chen
Vice President, Business Development

Christopher Day
Vice President, Marketing

DIRECTORS

Anne De Greef-Safft
Former Operating Company President,
Standex International and Danaher Corp

Hsiao-Wuen Hon
Corporate VP, Asia-Pacific R&D Group Chairman
Microsoft Corporation

Chenming C. Hu
TSMC Distinguished Chair Professor Emeritus and
Professor in the Graduate School, UC Berkeley

Leslie Kohn
Chief Technical Officer

Christopher B. Paisley
Dean's Executive Professor of Accounting,
Leavey School of Business, Santa Clara University

D. Jeffrey Richardson
Former Executive Vice President & COO,
LSI Corporation

Elizabeth Schwarting
Former Vice President,
Delphi Corporation (now Aptiv)

Andrew W. Verhalen
General Partner,
Matrix Partners

Feng-Ming (Fermi) Wang
President & Chief Executive Officer

COMMITTEES OF THE BOARD

Audit Committee

Christopher B. Paisley, Chairman
Chenming C. Hu
D. Jeffrey Richardson
Elizabeth Schwarting

Compensation Committee

D. Jeffrey Richardson, Chairman
Anne De Greef-Safft
Hsiao-Wuen Hon
Chenming C. Hu

Nominating and Corporate Governance Committee

Andrew W. Verhalen, Chairman
Anne De Greef-Safft
Christopher B. Paisley
D. Jeffrey Richardson
Elizabeth Schwarting

STOCK INFORMATION

Ambarella's ordinary shares are quoted on the
NASDAQ Global Select Market under "AMBA."

TRANSFER AGENT

Ambarella's transfer agent is Computershare Trust
Company, N.A. Computershare can be reached by
phone at (877) 373-6374 and by mail at
P.O. Box 43006, Providence, RI 02940
www.computershare.com

Registered shareholders should contact Computershare
in the event of a name change or a change of address.

INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

PricewaterhouseCoopers LLP, San Jose, CA

ANNUAL MEETING

The 2023 Annual Meeting of Shareholders will be held
at 9:00 a.m. Pacific Time on June 21, 2023 at:
Ambarella
3101 Jay Street
Santa Clara, California



3101 Jay Street
Santa Clara, CA 95054
Tel: (408) 734-8888

www.ambarella.com