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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2022

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from to

Commission File Number 001-39135

SiTime Corporation

(Exact name of Registrant as specified in its Charter)

Delaware	**02-0713868**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
5451 Patrick Henry Drive Santa Clara, CA	**95054**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (408) 328-4400

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 par value per share	SITM	The Nasdaq Stock Market LLC

Securities registered pursuant to Section 12(g) of the Act: **None**

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

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

Indicate by check mark whether the Registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES ☒ NO ☐

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
Emerging growth company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that 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 ff icers 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 Exchange Act). YES ☐ NO ☒

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant based on the last reported sale of the common stock on June 30, 2022, on the Nasdaq Global Market, was $2,402,136,679 based on the closing price of the registrant's common stock on such date of $163.03 per share.

The number of shares of Registrant's Common Stock outstanding as of February 9, 2023 was 21,701,624.

DOCUMENTS INCORPORATED BY REFERENCE

Part III incorporates by reference certain information from the registrant's definitive proxy statement for the 2023 Annual Meeting of Stockholders to be filed no later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2022.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

The information in this Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), which are subject to the "safe harbor" created by those sections. We may, in some cases, use words such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "objective," "plan," "potential," "predict," "project," "should," "will," "would," or the negative of those terms, and similar expressions that convey uncertainty of future events or outcomes to identify these forward-looking statements. Any statements contained herein that are not statements of historical facts may be deemed to be forward-looking statements. Forward-looking statements in this report include, but are not limited to, statements about:

- our plans to focus on oscillators, clock ICs, resonators and timing synchronization solutions and to aggressively expand our presence in these markets;
- our expectations regarding our ability to address market and customer demands and to timely develop new or enhanced solutions to meet those demands;
- anticipated trends, challenges and growth in our business and the markets in which we operate, including pricing expectations;
- our expectations regarding our revenue, average selling prices, gross margin, and expenses;
- our expectations regarding the effects of macroeconomic events in 2023;
- our expectations regarding dependence on a limited number of customers and end customers;
- our customer relationships and our ability to retain and expand our customer relationships and to achieve design wins;
- our expectations regarding the success, cost, and timing of new products;
- the size and growth potential of the markets for our solutions, and our ability to serve and expand our presence in those markets;
- our plans to expand sales and marketing efforts through increased collaboration with our distributors and contracted sales representatives, and our plans to grow direct online sales through our self-service online store;
- our expectations to identify new customers and deliver differentiated precision timing solutions to them through digital marketing strategies;

- our goal to become the leading provider of precision timing solutions for advanced and challenging applications;
- our positioning of being designed into current systems as well as future products;
- our belief that our advanced packaging designs can enable the smallest footprints in the industry;
- our expectations regarding competition in our existing and future markets;
- the impact of the COVID-19 pandemic will have on our business, employees, revenue and other operating results, liquidity, and cash flows, and its impact on the businesses of our suppliers and customers, and our anticipated responses thereto;
- our expectations regarding regulatory developments in the United States and foreign countries;
- our expectations regarding the performance of, and our relationships with, our third-party suppliers and manufacturers;
- our expectations regarding our and our customers' ability to respond successfully to technological or industry developments;
- our expectations regarding our ability to attract and retain key personnel;
- our expectations regarding intellectual property and related litigation;
- our belief as to the sufficiency of our existing cash and cash equivalents and short-term investments funds meet our cash needs for at least the next 12 months and our future capital requirements over the longer term;
- the adequacy and availability of our leased facilities;
- the accuracy of our estimates regarding capital requirements, and needs for additional financing.

These forward-looking statements reflect our management's beliefs and views with respect to future events and are based on estimates and assumptions as of the date of this report and are subject to risks and uncertainties. We discuss many of these risks in greater detail in the "Risk Factor Summary" below and under Item 1. "Risk Factors." Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Given these uncertainties, you should not place undue reliance on these forward-looking statements. We qualify all of the forward-looking statements in this report by these cautionary statements.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance, or events and circumstances reflected in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this report to conform these statements to actual results or to changes in our expectations, except as required by law.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this Annual Report on Form 10-K, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

Risk Factors Summary

Our business is subject to numerous risks, as more fully described in "Risk Factors" below. You should read these risks before you invest in our common stock. We may be unable, for many reasons, including those that are beyond our control, to implement or execute our business strategy. In particular, risks associated with our business include, among others:

- Global macroeconomic conditions have harmed and may continue to harm our business;
- We are subject to the cyclical nature of the semiconductor industry;
- We have historically depended on a limited number of customers for a significant portion of our revenue; if we are unable to expand or further diversify our customer base, our business, financial condition, and results of operations could suffer, and the loss of, or a significant reduction in orders from our customers, including a large customer or end customer, could significantly reduce our revenue and adversely impact our operating results;

- Because we do not typically have long-term purchase commitments with our customers, and orders may be cancelled, reduced, or rescheduled with little or no notice, which in turn exposes us to inventory risk, and may cause our business and results of operations to suffer;
- The third parties we rely upon for our raw materials, engineered materials, wafer fabrication and supply, assembly, packaging and testing may be unable to secure raw materials, reduce their resources available to us and our immediate suppliers, not meet satisfactory yields or quality, or increase pricing, which could harm our ability to ship our solutions to our customers on time and in the quantity required which could cause an unanticipated decline in our sales and loss of customers;
- A portion of our operations is located outside of the United States, which subjects us to additional risks, including increased complexity and costs of managing international operations and geopolitical instability;
- Our revenue and operating results may fluctuate from period to period due to, among other factors, macroeconomic conditions, cyclical fluctuations in the semiconductor market, customer demand, product life cycles, fluctuations in inventories held by our distributors or end customers, the gain or loss of significant customers, the availability of capacity in our supply chain, research and development costs, the impact of the COVID-19 pandemic on our business as well as our suppliers and customers, and product warranty claims. This in turn could cause our stock price to decline;
- Our success and future revenue depend on our ability to achieve design wins and to convince our current and prospective customers to design our products into their product offerings, as well as our customers' ability to develop products that achieve market acceptance;
- Our target customer and product markets may not grow or develop as we currently expect, and if we fail to penetrate new markets and scale successfully within those markets, our revenue and financial condition would be harmed;
- If we are not able to successfully introduce and ship in volume new products in a timely manner, our business and revenue will suffer;
- The impact and uncertainty related to the ongoing COVID-19 pandemic could adversely impact our business, results of operations and financial condition, as well as the businesses of our suppliers and customers;
- Our gross margins may fluctuate due to a variety of factors, which could negatively impact our results of operations and our financial condition;
- Our revenue in recent periods may not be indicative of future performance and our revenue may fluctuate over time;
- Our customers require our products and our third-party contractors to undergo a lengthy and expensive qualification process, which does not assure product sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, our business and operating results would suffer;
- We provide a lifetime warranty on our products and may be subject to warranty or product liability claims, which could harm our reputation, result in unexpected expenses, and cause us to lose market share;
- Defects in our products could harm our relationships with our customers and damage our reputation;
- If we fail to compete effectively, we may lose or fail to gain market share, which could negatively impact our operating results and our business;
- We may not be able to accurately predict our future capital needs, and we may not be able to obtain additional financing to fund our operations;
- We may seek, or be required to seek debt financing in the immediate or near term;
- If significant tariffs or other trade restrictions are placed on our products or third-party suppliers, our revenue and results of operations may be materially harmed;
- Failure to comply with the laws associated with our activities outside of the United States could subject us to penalties and other adverse consequences;
- We are subject to government regulation, including import, export and economic sanctions laws and regulations that may expose us to liability and increase our costs;
- New or future changes to U.S. and non-U.S. tax laws, or tax regulatory authorities disagreeing with our positions and conclusions regarding certain tax positions, could materially adversely affect us;

- Breaches or other disruptions of our security systems may damage our reputation and adversely affect our business;
- We may fail to adequately protect our intellectual property and have received, and may in the future receive, claims of intellectual property infringement, misappropriation, or other claims, which in turn could result in significant expense, result in the loss of significant rights, and harm our relationship with our end customers and distributors;
- We may be impacted by risks associated with MegaChips' ownership of a significant portion of our stock, for instance as long as MegaChips holds a significant amount of our stock, our other shareholders' ability to influence matters requiring stockholder approval will be limited, and there could be potential conflicts of interest between us and affiliates of MegaChips, which could impact our business and operating results;
- Substantial future sales of our common stock could cause the market price of our common stock to decline; and
- Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us more difficult, limit attempts by our stockholders to replace or remove our current management and limit the market price of our common stock.

PART I

Item 1. Business

Overview

The ability to accurately measure and reference time has been essential to many of humankind's greatest inventions and technological advances. Timing technology has continued to evolve over centuries, forming a critical aspect of broader technological advancement. Timing is the heartbeat of digital electronic systems, ensuring that the system runs smoothly and reliably by providing and distributing clock signals to various critical components such as CPUs, communication and interface chips, and radio frequency components. As electronics evolve to deliver higher performance levels, even in increasingly challenging environments, while also being more complex and space-constrained, we believe they will require more sophisticated timing solutions, and precision timing, a category that SiTime created, fills this need.

We are a leading provider of precision timing solutions to the global electronics industry. Our precision timing solutions are the heartbeat of our customers' electronic systems, providing the timing functionality that is needed for electronics to operate reliably and correctly. We provide precision timing solutions that are differentiated by high performance, high resilience, and high reliability, along with programmability, small size, and low power consumption. Our products have been designed into over 300 applications across our target markets, including communications and enterprise, automotive, industrial, aerospace, mobile, Internet of Things ("IoT"), and consumer. Our current solutions include various types of oscillators, as well as resonators and clock integrated circuits ("ICs"). Our all-silicon solutions are based on three fundamental areas of expertise: micro-electro-mechanical systems ("MEMS"), analog mixed-signal design capabilities, and advanced system-level integration expertise.

This expertise enables us to design silicon MEMS resonators, analog circuits, as well as systems and packaging, and put these all together to deliver a system-level solution that solves customers' complex timing problems. In this aspect, we are different than quartz-based providers, who typically have expertise in designing and manufacturing resonators, but usually outsource the analog and packaging. We also have a deep understanding of mechanical, electrical, and thermal properties of materials, which is a key requirement for developing our proprietary MEMS processes. To maximize MEMS first-silicon success, we have also developed our own MEMS simulation tools. We are also different in that our MEMS resonators are made using semiconductor technology, while the quartz suppliers use quartz crystal material. Compared to traditional clock IC suppliers, we are different in that we design the resonator in-house, and can integrate it into the clock IC package. Our analog/mixed-signal die are developed using industry-standard processes and deliver high levels of performance using programmable phase-locked loops ("PLLs"), temperature sensors, regulators, data converters, drivers and other building blocks. Unlike most clock IC vendors, we do not rely on quartz vendors to provide the quartz resonator clock reference that is required for their clock ICs to function. Our expertise creates supply chain advantages for us, and importantly, enables us to design and build complete timing systems that result in performance advantages, providing a complete solution to the customer.

Our precision timing solutions are designed to be resilient to environmental stressors. For the communications and enterprise market, our precision timing solutions provide high performance and resilience in dense, less-controlled environments that experience extreme conditions. The resilience of our products becomes an increasing advantage as equipment is placed in dense, harsh environments and moves closer to the customer with the rollout of 5G, the rapid expansion in cloudification, and deployment of hyperscale datacenters. For the automotive market, our solutions can be utilized in automotive electronics, including advanced driver assistance systems ("ADAS") for self-driving cars, which require increased timing accuracy. For the industrial market, our products offer programmability and high reliability for the diverse operating conditions of industrial equipment, including high temperatures, mechanical shock, and vibration. For the aerospace market, our solutions provide lower acceleration sensitivity for end products that operate in rugged conditions. For the mobile, IoT and consumer market, our timing solutions have the advantage of offering high performance at optimal power consumption and size, as our customers fit more functionality into smaller devices.

Commercial shipments of SiTime's first oscillator products began in 2006. Historically, our revenue has been substantially delivered from sales of oscillator systems across our target end markets. In addition to oscillator systems, we have expanded our products to include clock IC and timing sync solutions. We seek to expand our presence in our end markets across all product categories.

We sell our products primarily through distributors, who in turn sell to our end customers. We also sell products directly to some of our end customers. Based on sell-through information provided by our distributors, we believe the majority of our end customers are headquartered in the U.S. We leverage our global network of distributors to address the broad set of end markets we serve. For our largest accounts, dedicated sales personnel work with the end customer to ensure that our solutions fully address the end customer's timing needs. Our smaller customers can select the optimum timing solution for their needs by working directly with our distributors or by shopping on our online store, SiTimeDirect™.

We operate a fabless business model, where we outsource manufacturing to semiconductor industry suppliers, which allows us to focus on, and excel in, the design, marketing, and sales of our products. This model also allows us to operate with lower capital expenditure investment than other semiconductor companies who own fabs. A fabless infrastructure gives us production flexibility and the ability to scale capacity up and down quickly to meet demand. Our programmable architecture also plays a key role in ensuring optimal production flexibility, as it allows us to offer shorter lead times and the ability to meet custom requirements more easily.

Industry Background

Key Building Blocks of Timing Solutions

Timing solutions comprise of three key product types: resonators, oscillators, and clock ICs.

- Resonators are mechanical structures that vibrate at a precise frequency and provide the core accuracy and stability in oscillator systems. We create resonators in silicon using MEMS semiconductor technology, which is different than the quartz industry where the resonators are made from quartz crystals and are generally manufactured in non-semiconductor technologies.
- Oscillators are active systems that combine resonators with analog mixed-signal ICs that cause the resonators to vibrate, generating accurate and stable clock signals. Each oscillator generally delivers a single clock signal.
- Clock ICs are integrated analog mixed-signal circuits that deliver multiple clock signals by using building blocks such as PLLs, clock dividers, and drivers. Clock ICs require resonators and oscillators for timing references and usually integrate these blocks into complex systems.

In an electronic system, these three product types may be used individually or in combination, depending on the end product's performance, price, and size requirements. Simpler electronic systems generally require a standalone resonator coupled with a basic oscillator circuit that is embedded in a semiconductor device such as a microprocessor, system on a chip ("SoC"), or application specific integrated circuit ("ASIC"). In this type of system, multiple resonators may be used for different functionality. More complex electronic systems require advanced timing solutions that may integrate a variety of resonators, oscillators, and clock ICs. The complexity of these timing solutions increases significantly when the performance requirements of the systems that use them increase, such as electronic systems required to support the 5G communication network infrastructure.

Limitations of Legacy Quartz-based Solutions

Quartz crystal has been the predominant technology of choice for resonators for over half a century and will continue to play a role in the timing market. In a quartz oscillator, a quartz crystal resonator is paired with a silicon-based clock IC in a ceramic package. However, quartz timing devices, largely unchanged in decades, have many inherent limitations, including limited frequency ranges, sensitivity to rapid temperature changes, vulnerability to vibration and mechanical shock, susceptibility to frequency jumps at specific temperatures, and limited programmability. Quartz devices must be housed in ceramic packaging, and thus are difficult to integrate into standard semiconductor packages. Quartz products require dedicated manufacturing facilities and have relatively long lead times due to the need to specify various characteristics well in advance of production, without the ability to reconfigure them during the design cycle. In addition, as electronic systems become more complex, feature-rich, and robust, they require more sophisticated timing systems that can seamlessly integrate a variety of resonators, oscillators, and clock ICs in various system-level combinations. This seamless integration is more difficult with legacy quartz systems. These limitations impact the precision and quality of the timing signal in harsh conditions.

Precision MEMS Timing Solutions Poised to Disrupt the Market

In recent years, advances in silicon-based manufacturing and packaging techniques have allowed the development of alternatives to quartz crystal technology. We believe that MEMS is an ideal technology for resonator design. Specifically, its ability to integrate with other circuits in standard semiconductor packages has made scalable standard manufacturing possible for resonators and broader timing technology. MEMS timing products can operate in a wide range of frequencies, are more resistant to vibration, mechanical shock, and temperature changes, and are less susceptible to frequency jumps. MEMS technology is also inherently well-suited to produce timing solutions that are small, and offer high performance, resilience and programmability. Timing solutions based on MEMS technology are manufactured using semiconductor processes in fabrication plants with high capacity, allowing for cost-effective high-volume manufacturing.

Significant Market Opportunity for Precision Timing Solutions

According to Dedalus Consulting - 2019 Frequency Control Components Global Markets, End-Users, Applications & Competitors: Analysis & Forecasts and our estimates, the global timing market is expected to grow to $10.1 billion by 2024. Dedalus Consulting estimates that oscillators and standalone resonators will represent approximately $5.0 billion and $4.0 billion total addressable markets, respectively, in 2024. Based on our internal estimates, we believe clock ICs represent an approximate $1.0 billion total addressable market. As a subset of the broader timing market, the market for MEMS timing devices is projected to grow from approximately $0.25 billion in 2021 to $1.5 billion by 2027, representing a compound annual growth rate of approximately 35%, according to the "Status of The MEMS Industry 2022" report from Yole Intelligence, part of Yole Group, that was published in 2022.

The Opportunity for Advanced Solutions

From high-performance network infrastructure equipment to low-power battery-operated devices, precision timing solutions enable virtually all electronics. The complexity of such timing solutions increases significantly with the performance requirements of the systems in which they are used. Below are some examples of end markets in which we believe our silicon-based timing is enabling or has the potential to enable, greater functionality than legacy solutions:

Communications and Enterprise

According to Gartner, “Recent reports on 5G pilots and testing have identified a wide range of projected data throughput speeds ranging from 10 times up to 1,000 times faster than 4G. Other reports estimate ranges of one to 10 gigabytes per second.” Communications infrastructure equipment used in wireless base stations, wired infrastructure equipment, enterprise networks, and cloud data centers must provide high performance and stability in demanding environments, which may include temperature fluctuations, mechanical shocks, and vibration. If the timing solution within the equipment fails, networks can shut down, leading to service disruptions and higher operating costs.

Automotive, Industrial, and Aerospace

In automotive applications, timing technology must perform reliably over the life of an automobile in an environment characterized by vibration, mechanical shocks, electromagnetic interference, wide and rapid temperature change. The AECC (Automotive Edge Computing Consortium) estimated in 2020 that “data traffic from connected vehicles will exceed 1,000 times the present volume, surpassing 10 exabytes per month by 2025.” These communication systems will require highly-reliable precision timing. We believe precision timing can address many of the challenges associated with this demanding automotive ecosystem.

Industrial equipment, ranging from factory machinery to diagnostic equipment, is often exposed to environments characterized by temperature fluctuation, mechanical shocks, vibration, and electromagnetic interference. We believe our precision timing solutions can perform better than legacy quartz-based solutions in demanding industrial environments and with lower power consumption and higher reliability. In addition, with the highly diverse nature of industrial applications and the need for unique operating frequencies, we believe the programmable architecture of our precision timing products provides an advantage.

Timing devices used in aerospace and defense applications such as rockets and satellites need to withstand extreme vibration forces and temperature gradients during operation. Quartz-based solutions can be impacted by vibrating forces acting on the whole system. Precision timing devices are well-suited for these applications, as they provide up to 50 times better acceleration sensitivity under vibration than comparable quartz-based solutions.

Mobile, IoT and Consumer

The growing reliance on mobile devices and the IoT revolution has enabled the proliferation of billions of internet-connected devices in industrial and consumer applications. These devices range from smartphones and personal wearable devices to electronics embedded in appliances and industrial machinery. Many of these devices need to package a significant amount of electronics in a limited battery-powered and size-constrained form factor, while still requiring high performance and high accuracy. Due to the ability to integrate with ICs, we believe silicon MEMS timing solutions are well-suited to optimize footprint, reliability, and power consumption of the overall system within mobile, IoT and consumer devices.

Our Solutions and Technology

Our precision timing solutions comprise:

- **MEMS resonators**: We pioneered the silicon MEMS timing industry with the MEMS First®, EpiSeal®, and TempFlat® processes and technologies. These manufacturing processes have allowed the hermetically-sealed resonator die to be housed in industry-standard, low-cost plastic packages. These processes and technologies improve resonator stability, increase quality and reliability, and decrease aging effects. We believe our MEMS resonators are easy to integrate into silicon-based oscillators and clock ICs, and allow us to develop tightly-integrated precision timing solutions.
- **Oscillators and Clock ICs**: We have a dedicated analog and mixed-signal engineering team focused on the most complex challenges related to oscillators and clock ICs. Our analog mixed-signal technologies include several innovative low-noise circuit-based oscillators, high-performance PLLs, low-noise data converters, and precision low-aging reference circuits. Many of our oscillators use temperature sensing to maximize frequency stability. Our low-power nano-ampere and high-resolution DualMEMS® microkelvin-resolution sensing technologies stabilize our precision timing solutions despite rapid temperature changes. We also offer what we consider to be leading solutions across a range of attributes, including Allan deviation, power supply noise rejection, temperature-sensing resolution, and integrated phase jitter.
- **Advanced system-level integration**: We have extensive know-how in integrating various timing components into elegant system-level solutions. Our ability to integrate MEMS-based resonators with analog mixed-signal products allows us to develop oscillators and clock ICs in diverse permutations, which helps us solve difficult timing challenges. Using advanced packaging designs, we believe we can design our products to fit in the smallest footprints in the industry.

We design each key building block of the timing system, from MEMS resonators to oscillator circuits to clock ICs. Our ability to combine our MEMS resonators with analog-mixed signal components in a fabless semiconductor supply chain allows us to build full timing solutions from the ground up, enabling our customers to focus on their core expertise.

Our flexible and programmable precision timing solutions offer the following benefits:

- **High performance**: Our portfolio of MEMS-based precision timing products allows us to provide our customers with high performance solutions across a wide range of attributes including stability over temperature, vibration, phase jitter, and other metrics.
- **Small size**: Our solutions have a small footprint and package size, optimizing the end customer's board area. Additionally, many of our products have added integrated functions such as on-chip regulators and load capacitors which reduce the need for external components and decrease the overall system size.
- **Low power**: Our solutions operate at low power levels and have differentiated power-saving features such as NanoDrive™ and FlexSwing™, making them well-suited for mobile, IoT and other power-sensitive applications.
- **Programmability**: Our devices are configurable across a wide range of parameters, including frequency, stability metrics, voltage parameters, and temperature ranges, among others. This provides design flexibility for the customer, and enabling us to produce a vast number of custom timing products on demand with short lead times.
- **High quality and reliability**: The combination of our materials, design, and manufacturing processes enables us to produce high quality products with long-term reliability. Our solutions offer low sensitivity to electromagnetic energy, mechanical shock, vibration, airflow, temperature gradients and power supply noise.
- **Flexible integration**: Our MEMS resonators and clock ICs allow a wide range of packaging and integration methodologies to support various levels of size, cost, and electrical, thermal, and mechanical performance.
- **Leveraged product development**: Our solutions employ different combinations of MEMS and circuit components, enabling us to generate a vast number of custom part numbers, including over 40,000 unique part numbers shipped as of December 31, 2022.
- **Rapid time to market**: Our solutions can typically be delivered within weeks of initial customer order and configuration, enabling us to reduce our end customers' time to market.

Our Strategy

Our objective is to be the leading provider of precision timing solutions for advanced and challenging applications. Our solutions not only displace existing products by providing improved performance across a range of operational attributes, but also enable next-generation electronic applications by providing high performance at affordable price points. Key elements of our strategy include:

- **Extend our leadership in precision timing**. We intend to continue driving innovation in the timing market and working with our ecosystem partners to help set the timing standards of the future. Through this and other efforts, we expect to enable customers to create reference architectures and purchase complete solutions. We plan to improve the performance of our current solution suite across a variety of key metrics, including size, power, frequency stability, phase noise, and signal quality, while adding new functionality.
- **Educate and promote the benefits of silicon technology**. We intend to continue to educate current and prospective customers about the benefits of our precision timing solutions relative to their existing and future products. Our *Timing Essentials Learning Hub* is an online educational platform established to share our knowledge, though-leadership, and technology leadership.
- **Identify and promote new and emerging applications for our technologies**. We intend to continue to collaborate with our end customers to identify timing challenges related to their product roadmaps and to support new applications that would not be possible without SiTime's unique timing technology.
- **Enable future technology innovation**. We plan to continue to apply our MEMS, analog and mixed-signal, and systems expertise, as well as partner with leading technology companies to develop innovative products.

- **Broaden our product portfolio**. We intend to continue to broaden our product portfolio by offering additional varieties of oscillators, expanding our business in standalone resonators, and expanding into the clock IC market.
- **Continue to attract and acquire new customers**. We intend to continue expanding our end customer base through direct dialogue with large strategic accounts, partnerships with large distributors, as well as grow direct online sales with the SiTimeDirect store. With continued investment in our digital marketing strategies that advance the SiTime customer experience, along with sophisticated market segmentation efforts, we expect to identify new customers, and deliver differentiated precision timing solutions to them.
- **Drive margin expansion of our products**. We intend to use our technological expertise to deliver higher value and higher margin products through traditional and new innovative channels. In addition, we intend to continue to reduce our costs through operational improvements and supply-chain management initiatives.
- **Deliver lower cost of ownership**. In addition to differentiating our solutions based on technical features and value, we also intend to provide value to our customers on business metrics by leveraging our fabless semiconductor infrastructure. These benefits may include shorter lead times, higher quality and reliability, and therefore lower cost of ownership for the end customer.

Our Products

Our precision timing products are designed to address a wide range of applications across a broad array of end markets. Our product portfolio encompasses oscillators, clock ICs, and resonators. The programmability of our product platforms enables us to generate solutions quickly to customer specifications.

Today, we primarily supply oscillator products that comprise a MEMS resonator and an analog mixed-signal IC that are integrated into a package. The following table illustrates our current portfolio of promoted products by target end market:

Communications & Enterprise	Automotive, Aerospace & Defense, Industrial, Medical	Mobile, IoT & Consumer
Low Jitter Oscillators	High Temp Oscillators	Low Power Oscillators
DCXO In-System Programmable	Low Jitter Oscillators	µPower 32 kHz Oscillators
VCXO	DCXO In-System Programmable	µPower 32 kHz TCXO
TCXO/VCTCXO/ DCTCXO	VCXO	Low Power TCXO
OCXO/DCOCXO	Low Power Oscillators	Low Power DCXO
Network Synchronizers/ Jitter Cleaners	Spread Spectrum Oscillators	Active Resonators
Clock Generators	TCXO/VCTCXO/ DCTCXO	TCXO/VCTCXO/ DCTCXO
	µPower 32 kHz Oscillators	Active Resonators
	Active Resonators	

Our Customers

We primarily sell our precision timing products to distributors, who in turn sell our products to our end customers. We also sell products directly to some of our end customers. We work closely with our end customers throughout their design cycles and are able to develop long-term relationships as our technology becomes embedded in their products. As a result, we believe our products are well-positioned to be designed into their current systems and we are well-positioned to develop next generation solutions for their future products.

Pernas Electronics Co., Ltd. (“Pernas”), Arrow Electronics, Inc. (“Arrow”), and Quantek Technology Corporation (“Quantek”), three of our distributor customers, each directly accounted for more than 10% of our revenue in the years ended December 31, 2022, 2021, and 2020. Pernas directly accounted for 20%, 24%, and 26% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively, Arrow directly accounted for 17%, 14%, and 15% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively and Quantek directly accounted for 12%, 10%, and 18% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively. Other than Pernas, Quantek, and Arrow, no other single direct customer accounted for more than 10% of our revenue in the years ended December 31, 2022, 2021, and 2020.

Based on the sell-through information provided to us from distributors who identify end customers, we believe that the majority of our products sold to Pernas and Quantek are in turn incorporated into products of Apple Inc. (“Apple”), our largest end customer.

As a result, we believe revenue attributable to our largest end customer accounted for approximately 20%, 22%, and 40% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively.

Sales and Marketing

Our customers' design cycle from initial engagement to volume shipment typically ranges from six months to three years, with product life cycles of up to ten years or more. For many of our products, early engagement with our customers' technical staff is critical for success. To ensure an adequate level of early engagement, our sales, marketing, and customer and development engineers work closely with our customers and channel partners to understand, identify, and propose solutions to their systems' challenges. We work closely with our customers, including technology leaders for the communications markets, to anticipate end customer market needs. In some cases, we work with our end customers to better understand the end customers' market trends and new requirements that are being placed on our customers.

We sell our products worldwide through multiple channels, including our direct sales force and a network of distributors, contract manufacturers, contracted sales representatives, and independent design houses, as well as SiTimeDirect, our self-service online store. Our global sales strategy includes direct sales and distributors covering over 15,000 end customer accounts since inception.

We have a strategic accounts strategy executed by our direct sales force focused on design engineers, system architects and executive decision makers for the world's leading electronics companies. These customers lead electronics innovation for their segments, from communications, 5G, automotive, and consumer IoT, and build in SiTime precision timing solutions that deliver the performance required by these devices. Beyond the well established strategic account portfolio, we target a broad base of small to mid-size electronics OEMs and ODMs that accelerate growth and market expansion for SiTime. We intend to continue to expand our sales and marketing efforts through increased collaboration with our distributors and contracted sales representatives. In addition, we launched SiTimeDirect, a self-service online store supporting 24/7 sales of SiTime oscillators, shipped to over 30 countries globally. Our expert inside sales team supports a "self-service model" for customers. SiTime's unique field programmability combined with the convenience of an online store, with rapid configuration and fulfillment, makes SiTimeDirect a unique approach in the semiconductor industry for precision timing solutions.

Seasonality

Our revenue has historically been subject to some seasonal variation. Based on the production schedules of key customers, our products typically see stronger revenue in the second half of our fiscal year. However, this was not the case in 2022 and there can be no assurance that this trend will occur in future years.

Manufacturing

We operate a fabless business model and use third-party foundries and assembly and test contractors to manufacture, assemble and test our semiconductor products. This outsourced manufacturing approach allows us to focus our resources on the design, sale, and marketing of our products. In addition, we believe that outsourcing many of our manufacturing and assembly activities provides us with the flexibility needed to respond to new market opportunities and scale for customer demand, simplifies our operations, and significantly reduces our capital commitments.

We subject our third-party manufacturing contractors to rigorous qualification requirements to meet the high quality and reliability standards required of our products. We carefully qualify each of our partners and their processes before applying the technology to our products. Our engineers work closely with our foundries and other contractors to increase yield, lower manufacturing costs, and improve product quality.

- **Fabrication**. We currently utilize a range of semiconductor process generations to develop and manufacture our products. We use Robert Bosch LLC ("Bosch") in Germany and Taiwan Semiconductor Manufacturing Company ("TSMC") in Taiwan as our primary foundries and suppliers for our MEMS timing devices and analog mixed-signal circuit ICs, respectively.
- **Package, Assembly and Testing**. Upon the completion of processing at the foundry, we use third-party contractors for packaging, assembly, and testing, including Advanced Semiconductor Engineering, Inc. ("ASE"), Carsem (M) Sdn Bhd. ("Carsem"), and United Test and Assembly Center Ltd. ("UTAC") in Taiwan, Malaysia, and Thailand, respectively, as well

as Daishinku Corp. (“Daishinku”), UTAC, Hana Semiconductor (Ayutthaya) Co., Ltd, and ASE for ceramic packaging for some of our products.

- **Warehousing**. Our products are warehoused at our outsourced semiconductor assembly and test facilities located in Malaysia, Taiwan, and Thailand.

We have a supply agreement with Bosch under which Bosch has agreed to fabricate our MEMS wafers based on purchase orders placed by us. Bosch has discretion whether to accept our purchase orders, and we can terminate purchase orders for convenience by giving written notice prior to shipment. The initial term of the supply agreement is for ten years through February 2027 and automatically renews unless terminated by either party with three years’ advance notice beginning in February 2024. Other than Bosch, we do not have long-term supply agreements with most of our third-party manufacturing contractors, and we purchase products on a purchase order basis.

Research and Development

We believe that our future success depends on our ability to introduce enhancements on our existing products and to develop new products for both existing and new markets. As a result, a significant majority of our operating expenses has been allocated towards this effort. Our research and development efforts are focused primarily on MEMS and advanced clock IC design and advanced system-level integration for precision timing solutions.

We have assembled a core team of experienced engineers and systems designers who conduct research and development activities in the United States, the Netherlands, Malaysia, Finland, Japan, Taiwan, and Ukraine. As of December 31, 2022, we had 211 full-time equivalent employees supporting research and development efforts worldwide (representing approximately 56% of our total employee base).

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 technologies and proprietary know-how. As of December 31, 2022, we had 99 issued U.S. patents, expiring generally between 2026 and 2039, and 43 pending U.S. patent applications (including 12 provisional applications). We also had three foreign issued patents expiring in 2036 and four pending foreign patent applications. Our issued patents and pending patent applications generally relate to our MEMS fabrication process, MEMS resonators, circuits, packaging, and oscillator systems.

In addition to our own intellectual property, we also use third-party licenses for certain technologies embedded in our MEMS solutions. For example, we have a license to certain patents from Bosch relating to the design and manufacture of MEMS-based timing applications. The patent rights obtained under the license agreement expire between 2021 and 2029, and the license agreement expires upon expiration of the last patent licensed under the agreement. We do not believe there will be any significant impact upon expiration of these patents.

We generally control access to and use of our confidential information and trade secrets through the use of internal and external controls, including contractual protections with employees, contractors, and customers. We rely in part on the laws of the United States and international laws to protect our 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. However, we cannot guarantee that we have entered into such agreements with every such party and we may not have adequate remedies in case of a breach of any such agreements. Our trade secrets could be disclosed to our competitors or others may independently develop substantially equivalent technologies or otherwise gain access to our trade secrets. Trade secrets can be difficult to protect and some courts inside and outside of the United States are less willing or unwilling to protect trade secrets. Despite our efforts to protect our intellectual property, unauthorized parties may still copy, misappropriate, or otherwise obtain and use our software, technology, or other information that we regard as our proprietary intellectual property. In addition, we intend to expand our international operations, and effective patent, copyright, trademark, and trade secret, and other intellectual property protection may not be available or may be limited in some foreign countries.

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 have in the past received, and we may in the future receive, communications alleging liability for damages or challenging the validity of our intellectual property or proprietary rights. Any litigation, regardless of success or merit, could cause us to incur substantial expenses, reduce our sales, and divert the efforts of our management and other personnel. In the event we receive an adverse result in any litigation, we could be required to pay substantial damages, seek licenses from third parties, which may not be available on reasonable terms or at all, cease sale of products, expend significant resources to develop alternative technology, or discontinue the use of processes requiring the relevant technology.

Competition

The global semiconductor market in general, and the timing market in particular, is highly competitive. We expect competition to increase and intensify as additional companies enter our markets and as internal resources of large original equipment manufacturers ("OEMs") grow. Increased competition could result in price pressure, reduced gross margins, and loss of market share, any of which could harm our business, financial condition, and results of operations.

Our competitors range from large, international companies offering a wide range of timing products to smaller companies specializing in narrow market verticals. Companies that we primarily compete with include, but are not limited to, Abracon, LLC, Daishinku Corporation, Kyocera Corporation, Microchip Technology Inc., Murata Manufacturing Co., Ltd, Nihon Dempa Kogoyo., Ltd., Rakon Limited, Renesas Electronics Corporation, Seiko Epson Corporation, Skyworks Solutions, Inc., Texas Instruments Incorporated, and TXC Corporation.

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. This may enable them to better withstand downturns in the timing market in which we compete, as well as adverse economic or market conditions. During past periods of downturns in our industry, competition in the markets in which we operate intensified as our customers reduced their purchase orders. We maintain our competitive position through our ability to successfully design, develop, and market new and existing precision timing solutions in a timely manner and to retain existing customers and add new customers.

Government Regulation

Our business activities are worldwide and subject to various federal, state, local and foreign regulations and our products are governed by a number of rules and regulations. To date, our compliance with these regulations has not had a material impact on our results of operations.

Human Capital Resources and Empowerment

We believe that our company culture, which promotes innovation, open communication, and teamwork, has been critical to our success. Our success depends largely upon the continued services of our executive officers and other key employees and on our ability to continue to attract, retain and motivate qualified employees, particularly highly-skilled engineers involved in the design, development, support, and manufacture of new and existing products and processes, as well as our sales and marketing team which is critical to achieving design wins, creating our brand awareness and reputation, and building long-lasting relationships with our customers and other industry participants. In order for us to attract the best talent, we aim to offer challenging work in an environment that enables our employees to learn, grow, and reach their full potential.

Our human capital resource objectives include identifying, recruiting, retaining, incentivizing and integrating our existing and future employees. We strive to attract and retain the most talented employees in the industry and across the globe by offering competitive compensation and benefits that support their health, financial, and emotional well-being. Our compensation philosophy is based on rewarding each employee's individual contributions. We use a combination of fixed and variable pay including base salary, bonuses, performance awards and stock-based compensation. The principal purposes of our equity incentive plans are to attract, retain, and motivate selected employees through the granting of stock-based compensation awards. We offer employees benefits that vary by country and are designed to meet or exceed local laws and to be competitive in the marketplace. Examples of benefits offered in the U.S. include: a 401(k) plan with employer contributions; health benefits; life, business travel and disability insurance; additional voluntary insurance; paid time off and parental leave; and paid counseling assistance. For further information concerning our equity incentive plans, see Note 9, Stock-based Compensation, of the Notes to Consolidated Financial Statements contained in Part II, Item 8 of this Annual Report on Form 10-K.

We are committed to the health, safety and wellness of our employees. We provide our employees and their families with access to a variety of health and wellness programs, including benefits that support their physical and mental health. We maintain an office in Lviv, Ukraine. In connection with Russia's invasion of Ukraine in February 2022, we have prioritized the safety and welfare of our employees and their families in Ukraine. We also worked with our employees worldwide to minimize any disruption to our operations and business as a result of Russia's invasion of Ukraine. In response to the COVID-19 pandemic, we implemented safety measures designed to protect our employees. We believe we have been able to preserve our business continuity without sacrificing our commitment to keeping our employees safe during the COVID-19 pandemic.

We regularly review our employees and assess the needs of the business to identify our talent needs. We encourage periodic and meaningful conversations between managers and employees, including discussions regarding feedback, alignment of goals, and professional development. We encourage all employees to continue learning and provide learning opportunities as well as internal opportunities for cross functional work to support this. We regularly review succession plans and focus on promoting internal talent to help grow our employees' careers.

In an effort to continue to understand employee engagement and culture, we conducted a survey in 2022 and the survey results yielded an 8.5 out of 10 overall employee satisfaction rating, with particular mention of the benefits of the SiTime culture. We intend to survey our employees on an annual basis to enable us to respond to employee feedback, understand the evolution of the company culture, and improve team collaboration, efficiency and success.

As of December 31, 2022, we had 377 full-time equivalent employees located in the United States, France, Malaysia, the Netherlands, Taiwan, Japan, Finland and Ukraine, including 211 in research and development, 136 in sales, general, and administrative, and 30 in operations. We consider relations with our employees to be good and have never experienced a work stoppage.

Corporate Information

We were incorporated in Delaware on December 3, 2003. Our principal executive offices are located at 5451 Patrick Henry Drive, Santa Clara, California 95054, and our telephone number is (408) 328-4400. Our corporate website address is www.sitime.com. Information found on, or accessible through, our website is not a part of, and is not incorporated into, this Annual Report on Form 10-K. Unless the context requires otherwise, references in this Annual Report on Form 10-K to "SiTime," "the company," "we," "us" and "our" refer to SiTime Corporation and its wholly-owned subsidiaries on a consolidated basis.

Available Information

Our website is located at https://www.sitime.com. Copies of our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, are available, free of charge, on our investor relations website as soon as reasonably practicable after we file such material electronically with or furnish it to the Securities and Exchange Commission (the "SEC"). The SEC also maintains a website that contains our SEC filings. The address of the website is www.sec.gov.

Item 1A. Risk Factors.

Risks Related to Our Business and Our Industry

Global macroeconomic conditions have harmed and may continue to harm our business.

We are a global company and therefore our business, results of operations and financial condition are impacted by global macroeconomic conditions. Macroeconomic events such as rising inflation, recession, equity market volatility, geopolitical tensions, war, declines in income or asset values, decreased spending, changes to fuel and other energy costs, public health crises, supply chain disruptions, trade restrictions and sanctions, and the COVID-19 pandemic have caused economic volatility, which has and may continue to harm our business, financial condition, and results of operations, and may cause an extended downturn in the worldwide economy, which would further harm our business, financial condition and results of operations. Economic volatility and adverse economic conditions have affected and may continue to affect the demand for our products and our customers' products. Reduced demand for our customers' products has led to a build-up of inventory at our customers and their affiliates, partners, and contract manufacturers, which has and may continue to adversely affect demand for our products. Reduced demand for our products could result in significant decreases in our sales and margins, and could materially harm our results of operations. The future effects of macroeconomic events on our business and results of operations, including inventory levels at our customers and their affiliates, partners, and contract manufacturers as well as demand for our products, are uncertain and difficult to predict.

A deterioration in credit markets as a result of macroeconomic events could also limit our ability to obtain external financing to fund our operations and capital expenditures. We may experience losses on our holdings of cash and investments due to failures of financial institutions and other parties. Further, adverse economic conditions may also result in a higher rate of losses on our accounts receivables due to credit defaults. As a result, global macroeconomic conditions have had and may continue to have a material adverse effect on our business, results of operations, and financial condition.

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. The industry experienced a significant downturn during past adverse macroeconomic events such as global recessions, and we are currently experiencing a decrease in demand for our products. These downturns have been characterized by diminished product demand, production overcapacity, high inventory levels for us and our customers, and erosion of average selling prices. Any downturns in the semiconductor industry could harm our business, financial condition, and results of operations. In the last few years, the semiconductor industry experienced an upturn. Any significant upturn in the semiconductor industry could result in increased competition for access to third-party foundry and assembly capacity. We are dependent on the availability of this capacity to manufacture and assemble our products and we can provide no assurance that adequate capacity will be available to us in the future. We cannot predict the duration or timing of any downturn or upturn in the semiconductor industry.

We have historically depended on a limited number of customers for a significant portion of our revenue. If we are unable to expand or further diversify our customer base, our business, financial condition, and results of operations could suffer, and the loss of, or a significant reduction in orders from our customers, including a large customer or end customer, could significantly reduce our revenue and adversely impact our operating results.

Historically we have derived a significant portion of our revenue from a limited number of customers. We sell our products primarily through distributors, who in turn sell to our end customers. We also sell directly to our end customers. Our top three distributors by revenue together accounted for approximately 49%, 48%, and 59% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively. Based on our shipment information, we believe that revenue attributable to our ten largest end customers accounted for 47%, 49% and 58% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively. Sales attributable to Apple, our largest end customer accounted for approximately 20%, 22%, and 40% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively. Revenue attributable to this end customer increased in absolute dollars but decreased as a percentage of revenue from the year ended December 31, 2021 to 2022. We anticipate revenue attributable to this customer will fluctuate from period to period. Although we sell our products to this customer through distributors on a purchase order basis, including Pernas Electronics Co., Ltd. ("Pernas"), Arrow Electronics, Inc. ("Arrow"), and Quantek Technology Corporation ("Quantek"), we have a development and supply agreement, which provides a general framework for certain transactions with Apple. This agreement continues until either party terminates for material breach. Under this agreement, we have agreed to develop and deliver new products to this end customer at its request, provided it also meets our business purposes, and have agreed to indemnify it for intellectual property infringement or any injury or damages caused by our products. This end customer does not have any minimum or binding purchase obligations to us under this agreement and could elect to discontinue making purchases from us with little or no notice. We expect the composition of our largest end customers to vary from period to period, and that revenue attributable to our largest ten end customers in any given period may decline over time. Our relationships with existing customers may deter potential customers who compete with these customers from buying our precision timing solutions. We believe our operating results for the foreseeable future will continue to depend to a significant extent on sales attributable to a limited number of customers and end customers. If we are unable to expand or further diversify our customer base, it could harm our business, financial condition, and results of operations.

If our end customers were to choose to work with other manufacturers or our relationships with our customers are disrupted for any reason, it could have a significant negative impact on our business. Any reduction in sales attributable to our larger customers and end customers, including our largest end customer, would have a significant and disproportionate impact on our business, financial condition, and results of operations.

Because most of our sales are made pursuant to standard purchase orders, orders may be cancelled, reduced, or rescheduled with little or no notice and without penalty. Cancellations of orders could result in the loss of anticipated sales without allowing us sufficient time to reduce our inventory and operating expenses. In addition, changes in customer or end customer forecasts or the timing of orders from our customers could make demand for our products difficult for us to predict and could expose us to the risks of inventory shortages or excess inventory. This in turn could cause our operating results to fluctuate and could materially harm our results of operations.

Our end customers, or the distributors through which we sell to these customers, may choose to use products in addition to ours, use a different product altogether, or develop an in-house solution. In addition, the inability of our customers or their contract manufacturers to obtain sufficient supplies of third-party components used with our products could result in a decline in the demand of our products and a loss of sales. Any of these events could significantly harm our business, financial condition, and results of operations. Further, if our distributors' relationships with our end customers, including our larger end customers, are disrupted for inability to deliver sufficient products or for any other reason, it could have a significant negative impact on our business, financial condition, and results of operations.

Because we do not typically have long-term purchase commitments with our customers, orders may be cancelled, reduced, or rescheduled with little or no notice, which in turn exposes us to inventory risk, and may cause our business and results of operations to suffer.

We sell our products primarily through distributors, usually with no long-term or minimum purchase commitments from them or their end customers. Substantially all of our sales to date have been made on a purchase order basis, which orders may be cancelled, changed, or rescheduled with little or no notice or penalty. As a result, our revenue and operating results could fluctuate materially and could be materially and disproportionately impacted by purchasing decisions of our customers, including our larger customers. In the future, our distributors or their end customers may decide to purchase fewer units than they have in the past, may alter their purchasing patterns at any time with limited or no notice, or may decide not to continue to purchase our precision timing solutions at all, any of which could cause our revenue to decline materially and materially harm our business, financial condition, and results of operations. Cancellations of, reductions in, or rescheduling of customer orders could also result in the loss of anticipated sales without allowing us sufficient time to reduce our inventory and operating expenses, as a substantial portion of our expenses are fixed at least in the short term. In addition, forecasts provided by customers or their affiliates or contract manufacturers may change or may later prove to have been inaccurate which could make demand for our products difficult for us to predict and could expose us to the risks of inventory shortages or excess inventory and materially harm our results of operations. As we no longer intend to acquire inventory to pre-build custom products, we may not be able to fulfill increased demand in the short term. Any of the foregoing events could materially and adversely affect our business, financial condition, and results of operations.

We depend on third parties for our wafer fabrication, assembly, packaging, and testing operations, which exposes us to certain risks that may harm our business.

We operate an outsourced manufacturing business model. As a result, we rely on third parties for all of our manufacturing operations, including wafer fabrication, assembly, packaging, and testing. Although we use multiple third-party supplier sources, 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. The manufacturing processes of our third-party suppliers for our products require specialized technology that requires certain raw and engineered materials. Many major components, product equipment items, engineered materials, and raw materials, that are procured or subcontracted by our third-party suppliers for manufacturing of our products are procured or subcontracted on a single or sole-source basis. Except for our agreement with Bosch for MEMS wafers, we do not have any long-term supply agreements with any of our other manufacturing suppliers. These third-party manufacturers often serve customers that are larger than us or require a greater portion of their services, which may decrease our relative importance and negotiating leverage with these third parties.

If market demand for wafers or production and assembly materials increases, if a supplier of our wafers fails to procure materials needed for manufacture of our products, or if a supplier of our wafers ceases or suspends operations, our supply of wafers and other materials could become limited. We currently have a ten-year supply agreement with Bosch for the fabrication of our MEMS wafers. This agreement expires in 2027 and may be terminated with three years' advance notice beginning in February 2024. We currently rely on Bosch for our MEMS fabrication, and TSMC for our analog circuits fabrication, and any disruption in their supply of wafers or any increases in their wafer or materials prices could adversely affect our gross margins and our ability to meet customer demands in a timely manner, or at all, and lead to reduced revenue. There are currently a number of industry-wide supply constraints affecting the supply of analog circuits manufactured by certain foundries, including TSMC, and affecting outsourced semiconductor assembly and test providers ("OSATs"), which in the past has limited and may in the future limit our ability to fully satisfy an increase in demand for some of our products. Moreover, wafers constitute a large portion of our product cost. If we are unable to negotiate volume discounts or otherwise purchase wafers at favorable prices and in sufficient quantities in a timely manner, our ability to ship our solutions to our customers on time and in the quantity required could be adversely affected, which in turn could cause an unanticipated decline in our sales, harm to our customer relationships, and our gross margins to be adversely affected.

To ensure continued wafer supply, we may be required to establish alternative wafer supply sources, which could require significant expenditures and limit our negotiating leverage. We currently rely on Bosch and TSMC as our primary foundries and suppliers for our MEMS timing devices and analog circuits, respectively, and only a few foundry vendors have the capability to manufacture our most advanced solutions, in particular with respect to our MEMS solution. If we engage alternative supply sources, we may incur additional costs and encounter difficulties and/or delays in qualifying the supply sources. For example, we have a license agreement with Bosch under which Bosch granted us a license to use certain patents. Under this agreement, we are required to pay a royalty fee to Bosch if we engage third parties to manufacture, or if we decide to manufacture ourselves, certain generations of our MEMS wafers through March 31, 2024. In addition, shipments could be significantly delayed while these sources are qualified for volume production. If we are unable to maintain our relationship with Bosch or TSMC, our ability to produce high-quality products could suffer, which in turn could harm our business, financial condition, and results of operations.

We currently primarily rely on Advanced Semiconductor Engineering, Inc. (“ASE”), Carsem (M) Sdn. Bhd. (“Carsem”), and United Test and Assembly Center Ltd. (“UTAC”) for assembly and testing, as well as Daishinku Corp. (“Daishinku”), UTAC, Hana Semiconductor (Ayutthaya) Co., Ltd, and ASE for ceramic packaging for some of our products. We enter into capacity agreements with certain of our OSATs from time to time which may adversely impact our gross margins and results of operations if we do not purchase required minimum quantities.

Certain of our manufacturing, packaging, assembly, and testing facilities are located outside of the United States, including Malaysia, Taiwan, and Thailand, where we are subject to increased risk of political and economic instability, difficulties in managing operations, difficulties in enforcing contracts and our intellectual property, severe weather, and employment and labor difficulties. Additionally, public health crises, such as an outbreak of contagious diseases like the COVID-19 pandemic, may affect the production capabilities of our suppliers, including as a result of quarantines, closures of production facilities, lack of supplies, or delays caused by restrictions on travel or work-from-home orders. Restrictions like these could limit our suppliers’ ability to operate their manufacturing facilities.

Any of these factors could result in manufacturing and supply problems, and delays in our ability to provide our solutions to our customers on a timely basis, or at all. If we experience manufacturing problems at a particular location, we may be required to transfer manufacturing to a new location or supplier. Converting or transferring manufacturing from a primary location or supplier to a backup facility could be expensive and could take several quarters or more. 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. In addition, our end customers may require requalification with a new wafer manufacturer. We typically maintain at least a three-month supply of our MEMS wafers for which Bosch is our primary supplier. We do not otherwise maintain sufficient inventory to address a lengthy transition period. As a result, we may not be able to meet customer needs during such a transition, which could damage our customer relationships. Although we maintain business disruption insurance, this insurance may not be adequate to cover any losses we may experience as a result of such difficulties.

If one or more of the third parties we rely on for our manufacturing operations terminates its relationship with us, or if we encounter any problems with our manufacturing supply chain, 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, harm to our customer relationships and loss of customers.

A portion of our operations is 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 outsource the fabrication and assembly of all of our products to third parties that are primarily located in Germany and Asia. In addition, we conduct research and development activities in the United States, Japan, the Netherlands, Taiwan, Ukraine and Finland. We also conduct marketing and administrative functions in the United States, Japan, the Netherlands, China, Taiwan, Malaysia, and Ukraine. Certain of the critical functions for our business are performed in locations outside of the United States. Members of our sales force are located in various locations outside of the United States. In addition, approximately 88%, 94%, and 93% of our revenue for the years ended December 31, 2022, 2021, and 2020, respectively, was from distributors with ship-to locations outside the United States, although we believe the majority of our end customers are based in the U.S. based on sell-through information provided by these distributors. As a result of our international focus, we face numerous challenges and risks, including:

- complexity and costs of managing international operations, including manufacturing, assembly, and testing of our products and associated costs;
- geopolitical and military conflicts, including the effects of Russia’s invasion of Ukraine;
- economic instability, including the effects of rising inflation and increased interest rates;
- limited protection for, and vulnerability to theft of, our intellectual property rights, including our trade secrets;

- 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, including the ongoing trade tensions between the U.S. and China that has resulted in higher tariffs on certain semiconductor products;
- timing and availability of import and export licenses and other governmental approvals, permits, and licenses, including export classification requirements;
- foreign currency fluctuations and exchange losses relating to our international operating activities;
- restrictions imposed by the U.S. government or foreign governments on our ability to do business with certain companies or in certain countries as a result of international political conflicts or the COVID-19 pandemic and the complexity of complying with those restrictions;
- 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;
- difficulties in staffing international operations;
- changes in immigration policies which may impact our ability to hire personnel;
- local business and cultural factors that differ from our normal standards and practices;
- differing employment practices and labor relations;
- requirements in foreign countries which may impact availability of personnel, such as mandatory military service in countries such as Ukraine;
- heightened risk of terrorist acts;
- regional health issues and the impact of public health epidemics on employees and the global economy, such as the worldwide COVID-19 pandemic;
- power outages and natural disasters; and
- travel, work-from-home or other restrictions or stoppages, like those imposed by governments around the world as a result of the COVID-19 pandemic.

These risks could harm our international operations, delay new product releases, increase our operating costs, and hinder our ability to grow our operations and business and, consequently, our business, financial condition, and results of operations could suffer. For example, we rely on TSMC in Taiwan for the fabrication of our analog circuits and have sales force personnel in Taiwan and China. If political tensions between China and Taiwan were to increase further, it could disrupt our business and adversely affect our financial condition and results of operations given that we rely primarily on TSMC in Taiwan for our analog circuits. In addition, given the current political and military situation in Russia and Ukraine, if the relationship between Russia and the United States worsens further, or we are restricted or precluded from continuing our operations in Ukraine, it could disrupt our business, our costs could increase, and our product development efforts, business, financial condition, and results of operations could be significantly harmed. Further, the COVID-19 pandemic led to travel, work-from-home, and other restrictions, which significantly impacted our domestic and international operations and the operations of our suppliers, distributors, partners, and customers. At this point, the extent to which the COVID-19 pandemic may further impact our business remains uncertain but it may materially adversely affect our business, financial condition, or results of operations.

Our revenue and operating results may fluctuate from period to period, which could cause our stock price to fluctuate.

Our revenue and operating results have fluctuated in the past and may fluctuate from period to period in the future due to a variety of factors, many of which are beyond our control. We expect our revenue to fluctuate in the future primarily based on the volume of shipments of our products and average selling price ("ASP") changes. Though our ASP increased in 2022 compared to 2021, we may not be able to sustain ASP increases in the future. Factors relating to our business that may contribute to fluctuations in our operating results include the following factors, as well as other factors described elsewhere in this report:

- macroeconomic conditions;
- cyclical fluctuations in the semiconductor market;

- customer demand and product life cycles;
- the receipt, reduction, or cancellation of, or changes in the forecasts or timing of, orders by customers;
- fluctuations in the levels of inventories held by our distributors or end customers;
- the gain or loss of significant customers;
- supply chain disruptions, delays, shortages, and capacity limitations;
- market acceptance of our products and our customers' products;
- our ability to develop, introduce, and market new products and technologies on a timely basis;
- the timing and extent of product development costs;
- new product announcements and introductions by us or our competitors;
- our research and development costs and related new product expenditures and our ability to achieve cost reductions in a timely or predictable manner;
- seasonality and fluctuations in sales by product manufacturers that incorporate our precision timing solutions into their products;
- end-market demand into which we have limited insight, including cyclicality, seasonality, and the competitive landscape;
- the impact of the COVID-19 pandemic on our business, suppliers, and customers;
- fluctuations in our manufacturing yields;
- significant warranty claims, including those not covered by our suppliers;
- new accounting pronouncements or changes in existing accounting standards;
- loss of one or more of our executive officers or other key employees; and
- changes in our pricing, product cost, and product mix.

As a result of these and other factors, you should not rely on the results of any prior quarterly or annual periods, or any historical trends reflected in such results, as indications of our future revenue or operating performance. Fluctuations in our revenue and operating results could cause our stock price to decline and, as a result, you may lose some or all of your investment.

Our success and future revenue depend on our ability to achieve design wins and to convince our current and prospective customers to design our products into their product offerings. If we do not continue to win designs or our products are not designed into our customers' product offerings, our results of operations and business will be harmed.

We sell our precision timing solutions to customers who select our solutions for inclusion in their product offerings. This selection process is typically lengthy and may require us to incur significant design and development expenditures and dedicate scarce engineering resources in pursuit of a single design win with no assurance that our solutions will be selected. If we fail to convince our current or prospective customers to include our products in their product offerings or to achieve a consistent number of design wins, our business, financial condition, and results of operations will be harmed.

Because of our extended sales cycle, our revenue in future years is highly dependent on design wins we are awarded in prior years. It is typical that a design win will not result in meaningful revenue for a year or more, if at all. If we do not continue to achieve design wins in the short term, our revenue in the following years will deteriorate.

Further, a significant portion of our revenue in any period may depend on a single product design win with a large customer. As a result, the loss of any key design win or any significant delay in the ramp of volume production of the customer's products into which our product is designed could adversely affect our business, financial condition, and results of operations. We may not be able to maintain sales to our key customers or continue to secure key design wins for a variety of reasons, and our customers can stop incorporating our products into their product offerings with limited notice to us and suffer little or no penalty.

If we fail to anticipate or respond to technological shifts or market demands, or to timely develop new or enhanced products or technologies in response to the same, it could result in decreased revenue and the loss of our design wins to our competitors. Due to the interdependence of various components in the systems within which our products and the products of our competitors operate, customers are unlikely to change to another design, once adopted, until the next generation of a technology. As a result, if we fail to introduce new or enhanced products that meet the needs of our customers or penetrate new markets in a timely fashion, and our designs do not gain acceptance, we will lose market share and our competitive position.

The loss of a key customer or design win, a reduction in sales to any key customer, a significant delay or negative development in our customers' product development plans, or our inability to attract new significant customers or secure new key design wins could seriously impact our revenue and materially and adversely affect our business, financial condition, and results of operations.

We may experience difficulties demonstrating the value to customers of newer solutions if they believe existing solutions are adequate to meet end customer expectations. If we are unable to sell new generations of our product, our business would be harmed.

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 product offerings, particularly if they believe their customers are satisfied with prior offerings. 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. Because of the extensive time and resources that we invest in developing new solutions, if we are unable to sell new generations of our solutions, our revenue could decline and our business, financial condition, and results of operations would be negatively affected.

Some of our customer and other third-party agreements provide for joint and/or custom product development, which subject us to a number of risks, and any failure to execute on any of these arrangements could have a material adverse effect on our business, results of operations, and financial condition.

We have entered into development, product collaboration and technology licensing arrangements with some of our customers and other third parties, and we expect to enter into new arrangements of these kinds from time to time in the future. These agreements may increase risks for us, such as the risks related to timely delivery of new products, risks associated with the ownership of the intellectual property developed, risks that such activities may not result in products that are commercially successful or available in a timely fashion, and risks that third parties involved may abandon or fail to perform their obligations related to such agreements. In addition, such arrangements may provide for exclusivity periods during which we may only sell specified products or technologies to that particular customer. Any failure to timely develop commercially successful products under such arrangements as a result of any of these and other challenges could have a material adverse effect on our business, results of operations, and financial condition.

The success of our products is dependent on our customers' ability to develop products that achieve market acceptance, and our customers' failure to do so could negatively affect our business.

The success of our precision timing solutions is heavily dependent on the timely introduction, quality, and market acceptance of our customers' products incorporating our solutions, which are impacted by factors beyond our control. Our customers' products are often very complex and subject to design complexities that may result in design flaws, as well as potential defects, errors, and bugs. We have in the past been subject to delays and project cancellations as a result of design flaws in the products developed by our customers, changing market requirements, such as the customer adding a new feature, or because a customer's product fails their end customer's evaluation or field trial. In other cases, customer products are delayed due to incompatible deliverables from other vendors. We incur significant design and development costs in connection with designing our products for customers' products that may not ultimately achieve market acceptance. If our customers discover design flaws, defects, errors, or bugs in their products, or if they experience changing market requirements, failed evaluations or field trials, or incompatible deliverables from other vendors, they may delay, change, or cancel a project, and we may have incurred significant additional development costs and may not be able to recoup our costs, which in turn would adversely affect our business, financial condition, and results of operations.

Our target customer and product markets may not grow or develop as we currently expect, and if we fail to penetrate new markets and scale successfully within those markets, our revenue and financial condition would be harmed.

Our target markets include the communications and enterprise, automotive, industrial, aerospace, and mobile, IoT, and consumer markets. Substantially all of our revenue to date has been attributable to sales of MEMS oscillators. We have expanded our products to include clock IC and timing sync solutions. Any deterioration in our target customer or product markets or reduction in capital spending to support these markets could lead to a reduction in demand for our products, which would adversely affect our revenue and results of operations. Further, if our target customer markets, including the 5G communications or IoT and mobile markets, do not grow or develop in ways that we currently expect, demand for our technology may not materialize as expected, which would also negatively impact our business, financial condition, and results of operations.

We may be unable to predict the timing or development of trends in our target markets with any accuracy. If we fail to accurately predict market requirements or market demand for these solutions, our business will suffer. A market shift towards an industry standard that we may not support could significantly decrease the demand for our solutions.

Our future revenue growth, if any, will depend in part on our ability to expand within our existing markets and our ability to enter into new markets. Each of our end markets presents distinct and substantial challenges and risks and, in many cases, requires us to develop new customized solutions to address the particular requirements of that market. Meeting the technical requirements and securing future design wins in any of these new markets will require a substantial investment of our time and resources. We cannot assure you that we will secure future design wins from these or other new markets, or that we will achieve meaningful revenue from sales in these markets. If new markets do not develop as we currently anticipate or if we are unable to penetrate them and scale in them successfully, our revenue could decline.

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

Our sales have been historically denominated in U.S. dollars, even when sold to customers located outside of the U.S. An increase in the value of the U.S. dollar relative to the currencies of the countries in which our customers operate could increase the real cost to our customers of our products and impair the ability of our customers to cost-effectively purchase or integrate our solutions into their product offerings, which may materially affect the demand for our solutions and cause these customers to reduce their orders, or may increase pressure on us to lower our product prices, which in each case would adversely affect our revenue and business.

If we increase operations in other currencies in the future, we may experience foreign exchange gains or losses due to the volatility of other currencies compared to the U.S. dollar. Certain of our employees are located in Malaysia, the Netherlands, Taiwan, Japan, Korea, Germany, Finland, France, and Ukraine. Accordingly, a portion of our payroll as well as certain other operating expenses are paid in currencies other than the U.S. dollar. Our results of operations 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 results of operations. Furthermore, currency exchange rates have been especially volatile in the recent past, and these currency fluctuations may make it difficult for us to predict our results of operations.

The average selling prices of our individual products have fluctuated historically over time and may do so in the future, which could harm our revenue and gross margins.

Although on average selling prices of our products have increased over time as we introduce higher end products, the average selling prices of our individual products generally decrease over time. Our revenue is derived from sales to large distributors and, in some cases, we have agreed in advance to price reductions, generally over a period of time ranging from two months to three years, once the specified product begins to ship in volume. However, our customers may change their purchase orders and demand forecasts at any time with limited notice due in part to fluctuating end-market demand, which can sometimes lead to price renegotiations. Although these price renegotiations can sometimes result in the average selling prices of the specified product fluctuating over the shorter term, we expect average selling prices of individual products generally to decline over the longer term as that product and our end customers’ products mature.

We seek to offset the anticipated reductions in our average selling prices of individual products by reducing the cost of our products through improvements in manufacturing yields and lower wafer, assembly, and testing costs, developing new products, enhancing lower-cost products on a timely basis, and increasing unit sales. However, if we are unable to offset these anticipated reductions in our average selling prices, our business, financial condition, and results of operations could be negatively affected.

If we are not able to successfully introduce and ship in volume new products in a timely manner, our business and revenue will suffer.

We have developed products that we anticipate will have product life cycles of ten years or more, as well as other products in more volatile high growth or rapidly changing areas, which may have shorter life cycles. Our future success depends, in part, on our ability to develop and introduce new technologies and products that generate new sources of revenue to replace, or build upon, existing revenue streams. If we are unable to repeatedly introduce, in successive years, new products that ship in volume, or if our transition to these new products does not successfully occur prior to any decrease in revenue from our prior products, our revenue will likely decline significantly and rapidly.

The COVID-19 pandemic could adversely affect our business, results of operations, and financial condition.

The COVID-19 pandemic has impacted our workforce and the operations of our customers and suppliers. In response to the ongoing COVID-19 pandemic and related government measures, we implemented safety measures to protect our employees and contractors at our locations around the world. The effects of the ongoing COVID-19 pandemic on our business are evolving and difficult to predict. To date, the COVID-19 pandemic has significantly and negatively impacted the global economy and it is unclear how long the pandemic will continue to do so. Among other things, the continued COVID-19 pandemic may result in:

- a global economic recession or depression that could significantly reduce demand and/or prices for our products;
- reduced productivity in our product development, operations, marketing, sales, and other activities;

- disruptions to our supply chain; or
- higher rate of losses on our accounts receivables due to credit defaults.

The COVID-19 pandemic has also caused significant uncertainty and volatility in global financial markets and the trading prices for the common stock of technology companies, including us. Further adverse economic events resulting from the COVID-19 pandemic, including a recession, depression, or other sustained economic downturn, could materially and adversely affect our business, access to capital markets, and the value of our common stock.

Though we believe the production capabilities of our suppliers have been impacted as a result of safety measures, closures of production facilities, lack of supplies, or delays caused by the COVID-19 pandemic, to date we believe we have experienced minimal impact from any delay and disruption in the manufacture, shipment, and sales of our products. However, as the COVID-19 pandemic continues, the effects of the pandemic, including timing and overall demand for our products, and availability of supply chain, may negatively and materially impact our business, results of operations, and financial condition. Further, as safety measures terminate and individuals return to work in offices, we may experience a reduction in demand for certain of our products that are incorporated in our customers' products that experienced higher demand during the COVID-19 pandemic. Any disruption in the manufacture, shipment, or sales of our products may negatively and materially impact our operating results.

Given the changing nature and continuing uncertainty surrounding COVID-19 due to public health challenges, governmental directives, and economic disruption, and the duration of the foregoing, the potential impact that the COVID-19 pandemic could have on our business, results of operations, and financial condition, and on the other risk factors described in this "Risk Factors" section, remain unclear.

Our gross margins may fluctuate due to a variety of factors, which could negatively impact our results of operations and our financial condition.

Our gross margins may fluctuate due to a number of factors, including customer and product mix, market acceptance of our new products, timing and seasonality of the end-market demand, yield, wafer pricing, packaging, and testing costs, competitive pricing dynamics, the impact of the COVID-19 pandemic, and geographic and market pricing strategies.

To attract new customers or retain existing customers, we have in the past and will in the future offer certain customers favorable prices, which would decrease our average selling prices and likely impact gross margins. Further, we may also offer pricing incentives to our customers on earlier generations of products that inherently have a higher cost structure, which would negatively affect our gross margins. In addition, in the event our customers, including our larger end customers, exert more pressure with respect to pricing and other terms with us, it could put downward pressure on our margins.

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 further reduce our gross margins. For instance, we continue to see increases in our manufacturing costs in fiscal year 2023 due to industry wide increases in costs. We rely primarily on obtaining yield improvements and volume-based cost reductions to drive cost reductions in the manufacture of existing products, introducing new products that incorporate advanced features and optimize die size, and other price and performance factors that enable us to increase revenue while maintaining gross margins. To the extent that such cost reductions or revenue increases do not occur at a sufficient level and in a timely manner, our business, financial condition, and results of operations could be adversely affected.

In addition, we maintain an inventory of our products at various stages of production and in some cases as finished good inventory. We hold these inventories in anticipation of customer orders. If those customer orders do not materialize in a timely manner, we may have excess or obsolete inventory which we would have to reserve or write-down, and our gross margins would be adversely affected.

Our revenue in recent periods may not be indicative of future performance and our revenue may fluctuate over time.

Our recent revenue should not be considered indicative of our future performance. Our revenue was $283.6 million, $218.8 million, and $116.2 million for the years ended December 31, 2022, 2021, and 2020, respectively. You should not rely on our revenue for any previous quarterly or annual periods as any indication of our revenue for future fiscal periods. As we grow our business, our revenue may fluctuate in future periods due to a number of reasons, which may include macroeconomic conditions, slowing demand for our products, increasing competition, the impact of the COVID-19 pandemic, a decrease in the growth of our overall market or market saturation, or our failure to capitalize on growth opportunities.

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

In order to succeed in executing our business plan, we will need to manage our growth effectively as we make significant investments in research and development and sales and marketing, and expand our operations and infrastructure both domestically and internationally. If our revenue does not increase to offset these increases in our expenses, we may not achieve or maintain profitability in future periods.

To manage our growth effectively, we must continue to expand our operations, engineering, financial accounting, internal management, and other systems, procedures, and controls. This may require substantial managerial and financial resources, and our efforts may not be successful. Any failure to successfully implement systems enhancements and improvements will likely have a negative impact on our ability to manage our expected growth, as well as our ability to ensure uninterrupted operation of key business systems and compliance with the rules and regulations applicable to public companies. If we are unable to manage our growth effectively, we may not be able to take advantage of market opportunities or develop new precision timing solutions, and we may fail to satisfy customer product or support requirements, maintain the quality of our solutions, execute our business plan or respond to competitive pressures, any of which could negatively affect our business, financial condition, and results of operations.

Our customers require our products and our third-party contractors to undergo a lengthy and expensive qualification process, which does not assure product sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, our business and operating results would suffer.

Prior to purchasing our precision timing solutions, our customers require that both our solutions 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. This qualification process may continue for several months. However, 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 with our customers, 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 qualifying our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, sales of those products to the customer may be precluded or delayed, which would cause our business, financial condition, and results of operations to suffer.

We provide a lifetime warranty on our products and may be subject to warranty or product liability claims, which could result in unexpected expenses and loss of market share.

We provide a lifetime warranty on our products and generally agree to indemnify our customers for defects in our products or failure of our products to meet our product specifications. Defects in our products could make our products unsafe and create a risk of property damage or personal injury. These risks may increase where our products are incorporated into specialized end products in industries such as automotive, aerospace, defense, and medical device. We may be subject to warranty or product liability claims. These claims may require us to make significant expenditures to defend those claims, replace our solutions, refund payments, or pay damage awards. This risk is exacerbated by the lifetime warranty of our products, which exposes us to warranty claims for the entire product lifecycle.

Our precision timing solutions have only been incorporated into end products since 2008. Accordingly, the operation of our products and technology has not been validated over longer periods. If a customer’s product fails in use, the customer may incur significant monetary damages, including a product recall or associated replacement expenses as well as lost revenue. The customer may claim that a defect in our product caused the product failure and assert a claim against us to recover monetary damages. In certain situations, circumstances might warrant that we consider incurring the costs or expenses related to a recall of one of our products in order to avoid the potential claims that may be raised should a customer reasonably rely upon our product and suffer a failure due to a design or manufacturing process defect. In addition, the cost of defending these claims and satisfying any arbitration award or judgment with respect to these claims would result in unexpected expenses, which could be substantial, and could harm our business, financial condition, and results of operations. Although we carry product liability insurance, this insurance is subject to significant deductibles and may not adequately cover our costs arising from defects in our products or otherwise.

Defects in our products or failures to meet product specifications could harm our relationships with our customers and damage our reputation.

Our products must meet demanding specifications for quality, performance, and reliability. Defects in our products or failure of our products to meet required product specifications may cause our customers to be reluctant to buy our products, which could harm our ability to retain existing customers and attract new customers and adversely impact our reputation. The process of identifying a defective or potentially defective product in systems that have been widely distributed may be lengthy and require significant resources. Further, if we are unable to determine the root cause of a problem or find an appropriate solution, we may delay shipment to customers. As a result, we may incur significant replacement costs and contract damage claims from our customers, and our reputation, business, financial condition, and results of operations may be adversely affected.

Though we are not currently aware of any occurrences, from time to time our products may be diverted from our supply chain or authorized distribution channels and sold on the “black market” or “gray market.” Customers purchasing our products on the black market or the gray market may use our products for purposes for which they were not intended, or may purchase counterfeit or substandard products, for instance that have been altered or damaged, which could result in damage to property or persons which could harm our business and cause our reputation to be adversely affected.

If we fail to accurately anticipate and respond to rapid technological change in the industries in which we operate, our ability to attract and retain customers could be impaired and our competitive position could be harmed.

We operate in industries characterized by rapidly changing technologies as well as technological obsolescence. The introduction of new products by our competitors, the delay or cancellation of any of our customers’ product offerings for which our precision timing solutions are designed, the market acceptance of products based on new or alternative technologies, or the emergence of new industry standards could render our existing or future products uncompetitive, obsolete, and otherwise unmarketable. Our failure to anticipate or timely develop new or enhanced products or technologies in response to changing market demand, whether due to technological shifts or otherwise, could result in the loss of customers and decreased revenue and have an adverse effect on our business, financial condition, and results of operations.

If our products do not conform to, or are not compatible with, existing or emerging industry standards, demand for our existing solutions may decrease, which in turn would harm our business and operating results.

We design certain of our products to conform to current industry standards. Some industry standards may not be widely adopted or implemented uniformly and competing standards may emerge that may be preferred by our distributors or our end customers.

Our ability to compete in the future will depend on our ability to identify and ensure compliance with evolving industry standards in our target markets, as well as in the timing IC industry. The emergence of new industry standards could render our products incompatible with products developed by third-party suppliers or make it difficult for our products to meet the requirements of certain OEMs. If our customers or our third-party suppliers adopt new or competing industry standards with which our solutions are not compatible, or if industry groups fail to adopt standards with which our solutions are compatible, our products would become less desirable to our current or prospective customers. As a result, our sales would suffer, and we could be required to make significant expenditures to develop new products. Although we believe our products are compliant with applicable industry standards, proprietary enhancements may not in the future result in conformance with existing industry standards under all circumstances. If our products do not conform to, or are not compatible with, existing or emerging standards, it would harm our business, financial condition, and results of operations.

We may be unable to make the substantial investments that are required to remain competitive in our business.

The semiconductor industry requires substantial and continuous investment in research and development in order to bring to market new and enhanced solutions. We expect our research and development expenditures to increase in the future as part of our strategy to increase demand for our solutions in our current markets and to expand into additional markets. We are a smaller company with limited resources, and we may not have sufficient resources to maintain the level of investment in research and development required to remain competitive. 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.

If we fail to compete effectively, we may lose or fail to gain market share, which could negatively impact our operating results and our business.

The global semiconductor market in general, and the timing market in particular, is highly competitive. We expect competition to increase and intensify as additional companies enter our target markets, and as internal silicon design resources of large OEMs grow. Increased competition could result in price pressure, reduced gross margins and loss of market share, any of which could harm our business, financial condition, and results of operations. Our competitors range from large, international companies offering a wide range of timing products to smaller companies, including start-ups, specializing in narrow market verticals. Companies that we primarily compete with include, but are not limited to, Abracon LLC, Daishinku Corporation, Kyocera Corporation, Microchip Technology Inc., Murata Manufacturing Co., Ltd., Nihon Dempa Kogyo Co., Ltd., Rakon Limited, Renesas Electronics Corporation, Seiko Epson Corporation, Skyworks Solutions, Inc., Texas Instruments Incorporated, and TXC Corporation. We expect competition in our current markets to increase in the future as existing competitors improve or expand their technology and product offerings and as new competitors enter these markets. In addition, our future growth will depend in part on our ability to successfully enter and compete in new markets. Some of these markets will likely be served by only a few large, multinational OEMs with substantial negotiating and buying power relative to us and, in some instances, with internally developed silicon solutions that can be competitive to our products.

Our ability to compete successfully depends, in part, on factors that are 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, government support, and other resources, are more established than we are, and have significantly better brand recognition and broader product offerings. This may enable them to better withstand downturns in the timing market in which we compete, as well as adverse economic or market conditions. Our ability to compete successfully will depend on a number of factors, including:

- our ability to define, design, and regularly introduce new products that anticipate the functionality and integration needs of our customers' next-generation products and applications;
- our ability to build strong and long-lasting relationships with our customers and other industry participants;
- our ability to capitalize on, and prevent losses due to, vertical integration by significant customers;
- our solutions' performance and cost-effectiveness relative to those of competing products;
- our ability to achieve design wins;
- the effectiveness and success of our customers' products utilizing our solutions within their competitive end markets;
- our research and development capabilities to provide innovative solutions and maintain our product roadmap;
- the strength of our sales and marketing efforts, including those of our distributors, and our brand awareness and reputation;
- our ability to secure capacity with our foundry and assembly partners to manufacture and assemble our products;
- our ability to deliver products in volume on a timely basis at competitive prices;
- our ability to withstand or respond to significant price competition;
- our ability to build and expand international operations in a cost-effective manner;
- our ability to obtain, maintain, protect, and enforce our intellectual property rights, including obtaining intellectual property rights from third-parties that may be necessary to meet the evolving demands of the market;
- our ability to defend potential patent infringement claims arising from third-parties;
- our ability to promote and support our customers' incorporation of our solutions into their products; and
- our ability to retain high-level talent, including our management team and engineers.

Our competitors may also establish cooperative relationships among themselves or with third-parties or may acquire companies that provide similar products to ours. As a result, new competitors or alliances may emerge that could capture significant market share. Additionally, timing suppliers, especially resonator suppliers, may engage directly with our customers to help the customer build timing products, and eliminate the need for an external timing supplier in some of their applications. Any of these factors, alone or in combination with others, could harm our business, financial condition, and results of operations and result in a loss of market share and an increase in pricing pressure.

We depend on our executive officers and other key employees, and the loss of one or more of these employees or an inability to attract or retain highly skilled employees could adversely affect our business.

Our success depends largely upon the continued services of our executive officers and other highly skilled key employees, including in engineering, product development, operations, sales, and marketing. From time to time, there may be changes in our executive management team or other key personnel, which could disrupt our business. We do not have employment agreements with our executive officers or other key personnel that require them to continue to work for us for any specified period and, therefore, they could terminate their employment with us at any time. The loss of one or more of our executive officers or other key employees, including due to adverse business conditions, could have an adverse effect on our business.

In addition, to execute our growth plan, we must attract and retain highly qualified personnel. Competition for these personnel is intense, especially for engineers with MEMS technology and advanced clock IC design expertise. We have from time to time experienced, and we expect to continue to experience, difficulty in hiring and retaining employees with appropriate qualifications. Many of the companies with which we compete for experienced personnel have greater resources than we have. If we hire employees from competitors or other companies, their former employers may attempt to assert that these employees or we have breached legal obligations, resulting in a diversion of our time and resources. In addition, job candidates and existing employees often consider the value of the equity awards they receive in connection with their employment. If the perceived value of our equity awards declines, it may adversely affect our ability to recruit and retain highly skilled employees. Further, changes in immigration policies may negatively impact our ability to attract and retain personnel, including personnel with specialized technical expertise. If we fail to attract new personnel or fail to retain or motivate our current personnel, our business and future growth prospects could be adversely affected.

Our company culture has contributed to our success and if we cannot maintain this culture as we grow, our business could be harmed.

We believe that our company culture, which promotes innovation, open communication, and teamwork, has been critical to our success. We face a number of challenges that may affect our ability to sustain our corporate culture, including:

- the potential failure to identify, attract, reward, and retain people in leadership positions in our organization who share and further our culture, values, and mission;
- the increasing size and geographic diversity of our workforce;
- competitive pressures to move in directions that may divert us from our mission, vision, and values;
- the continued challenges of a rapidly-evolving industry; and
- the increasing need to develop expertise in new areas of business that affect us.

If we are not able to maintain our culture, our business, financial condition, and results of operations could be adversely affected.

We may make acquisitions in the future that could disrupt our business, cause dilution to our stockholders, reduce our financial resources, and harm our business.

In the future, we may acquire other businesses, products, or technologies. Our ability to make acquisitions and successfully integrate personnel, technologies, or operations of any acquired business is unproven. If we complete acquisitions, we may not achieve the combined revenue, cost synergies, or other benefits from the acquisition that we anticipate, strengthen our competitive position, or achieve our other goals in a timely manner, or at all, and these acquisitions may be viewed negatively by our customers, financial markets, or investors. In addition, any acquisitions we make may create difficulties in integrating personnel, technologies, and operations from the acquired businesses and in retaining and motivating key personnel. 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, financial condition, and results of operations. Acquisitions may also reduce our cash available for operations and other uses, and could 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, financial condition, and results of operations.

If the foundries with which we contract do not achieve satisfactory yields or quality, our reputation and customer relationships could be harmed.

We depend on satisfactory wafer foundry manufacturing capacity, wafer prices, and production yields, as well as timely wafer delivery to meet customer demand and enable us to maintain gross margins. The fabrication of our products 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 may experience manufacturing defects and reduced manufacturing yields from time to time. Further, any new foundry vendors we employ may present additional and unexpected manufacturing challenges that could require significant management time and focus. Changes in manufacturing processes or the inadvertent use of defective or contaminated materials by the foundries that we employ could result in lower than anticipated production yields or unacceptable performance of our devices. 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 production yields from the foundries that we employ, or defects, integration issues, or other performance problems in our solutions could significantly harm our customer relationships and financial results and give rise to financial or other damages to our customers. Any product liability claim brought against us, even if unsuccessful, would likely be time-consuming and costly to defend.

Manufacturing yields for new products initially tend to be lower as we complete product development and commence volume manufacturing, and typically increase as we bring the product to full production. Our business model includes this assumption of improving manufacturing yields and, as a result, material variances between projected and actual manufacturing yields will have a direct effect on our gross margin and profitability. The difficulty of accurately forecasting manufacturing yields and maintaining cost competitiveness through improving manufacturing yields will continue to be magnified by the increasing process complexity of manufacturing semiconductor products.

Raw material and engineered material availability and price fluctuations have in the past and may in the future increase the cost of our products, impact our ability to meet customer commitments, and may adversely affect our results of operations.

The cost of raw and engineered materials is a key element in the cost of our products. Our inability to offset material price inflation through increased prices to customers, suppliers, productivity actions, or through commodity hedges could adversely affect our results of operations. Many major components, product equipment items, engineered materials, and raw materials, are procured or subcontracted on a single or sole-source basis. Although we maintain a qualification and performance surveillance process and we believe that sources of supply for engineered materials, raw materials, and components are generally adequate, it is difficult to predict what effects shortages or price increases may have in the future. Our inability to fill our supply needs would jeopardize our ability to ship our solutions to our customers on time and in the quantity required, which could, in turn, result in reduced sales and profits, and damage to our customer relationships.

Furthermore, increases in the price of silicon wafers, testing costs, and commodities, which may result in increased production costs, mainly assembly and packaging costs, may result in a decrease in our gross margins. Moreover, our suppliers may pass the increase in engineered materials, raw materials and commodity costs onto us which would further reduce the gross margin of our products. In addition, as we are a fabless company, global market trends such as a shortage of capacity to fulfill our fabrication needs also may increase our raw material costs and thus decrease our gross margin.

We rely on our relationships with industry and technology leaders to enhance our product offerings and our inability to continue to develop or maintain such relationships in the future would harm our ability to remain competitive.

We develop many of our precision timing solutions for applications in systems that are driven by industry and technology leaders in the communications and computing markets. We work with distributors, OEMs, and system manufacturers to define industry conventions and standards within our target markets. We believe that these relationships enhance our ability to achieve market acceptance and widespread adoption of our products. If we are unable to continue to develop or maintain these relationships, our precision timing solutions could become less desirable to our customers, our sales could suffer and our competitive position could be harmed.

Our ability to receive timely payments from, or the deterioration of the financial conditions of, our distributors or our end customers could adversely affect our operating results.

Our ability to receive timely payments from or the deterioration of the financial condition of, our distributors or our end customers could adversely impact our collection of accounts receivable, and, as a result, our revenue. We regularly review the collectability and creditworthiness of our customers to determine an appropriate allowance for credit losses. Based on our review of our customers annually and as of December 31, 2022, substantially all of which are large distributors, OEMs, and system manufacturers, we had $0.1 million and $0.1 million in allowance for credit losses as of December 31, 2022 and December 31, 2021, respectively. If our credit losses, however, were to exceed our current or future allowance for credit losses, our business, financial condition, and results of operations would be adversely affected.

We may not be able to accurately 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, stockholders may experience significant dilution of their ownership interest, and the newly-issued securities may have rights senior to those of the holders of our common stock. 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 additional 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 solutions, take advantage of business opportunities, or respond to competitive pressures, which could negatively impact our revenue and the competitiveness of our products.

We may seek, or be required to seek, debt financing in the immediate or near term.

We may seek, or be required to seek, debt financing. Any required financing may not be available on terms acceptable to us, or at all. The terms of any 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 additional interest expense. If financing is not available when required or is not available on acceptable terms, it could harm our liquidity position and we may have to scale back our operations or limit our production activities, which in turn would harm our business, operating results, and financial condition.

If significant tariffs or other trade restrictions are placed on our products or third-party suppliers, our revenue and results of operations may be materially harmed.

Most of our revenue has been from sales of products to distributors with ship-to locations outside of the United States. Many of our third-party suppliers are located outside of the United States. If significant tariffs or other restrictions are placed on certain goods, existing tariffs are increased, or any related counter-measures are taken by other countries, our revenue and results of operations may be materially and adversely affected. For example, beginning in July 2018, the U.S. Trade Representative imposed tariffs on products from China and China then imposed certain retaliatory tariffs. It is uncertain what further alterations to trade terms between China and the United States may occur, including limiting trade with China and imposing additional tariffs on imports from China. In the event that these or future tariffs are imposed on imports of our products or on our third-party suppliers, or that China or other countries take retaliatory trade measures in response to existing or future tariffs or other trade restrictions, or that the United States imposes further restrictions on trade with China, our business may be impacted, and we may be required to raise prices or make changes to our operations, or we may not be able to sell our products to customers in China, any of which could materially harm our revenue or operating results.

Failure to comply with the 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 anti-corruption laws and anti-bribery laws, including, without limitation, the U.S. Foreign Corrupt Practices Act of 1977, as amended (the "FCPA"), the U.S. Travel Act, and the UK Bribery Act 2010, 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. Any violation of these 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 an adverse effect on our reputation, business, financial condition, and results of operations.

We are subject to government regulation, including import, export and economic sanctions laws and regulations that may expose us to liability and increase our costs.

Our products and technology are subject to U.S. export controls, including the U.S. Department of Commerce's Export Administration Regulations ("EAR") and economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls. These regulations may limit the export of our products and technology, and provision of our services outside of the United States, or may require export authorizations, including by license, a license exception, or other appropriate government authorizations and conditions, including annual or semi-annual reporting. Export control and economic sanctions laws may also include prohibitions on the sale or supply of certain of our products to embargoed or sanctioned countries, regions, governments, persons, and entities. For example, we sell to markets in Asia where multiple companies have been added to the Entity List, requiring license for exports of items subject to control under the EAR. To our knowledge, we have not sold products subject to the EAR to Entity List persons. In addition, various countries regulate the importation of certain products, through import permitting and licensing requirements, and have enacted laws that could limit our ability to distribute our products. The exportation, re-exportation, and importation of our products and technology and the provision of services, including by our partners, must comply with U.S. and other laws or else we may be adversely affected through reputational harm, government investigations, penalties, and a denial or curtailment of our ability to export our products and technology. Although we take precautions to prevent our products and technology from being provided in violation of such laws, our products and technology may have previously been, and could in the future be, provided inadvertently in violation of such laws, despite the precautions we take. Changes in export or import laws or sanctions policies also may adversely impact our operations, delay the introduction and sale of our products in international markets, or, in some cases, prevent the export or import of our products and technology to certain countries, regions, governments, persons, or entities altogether, which could adversely affect our business, financial condition, and results of operations.

Changes in environmental laws or regulations, including conflict minerals rules, could impair our ability to compete in international markets.

Our product or manufacturing standards could be impacted by new or revised environmental rules and regulations or other social initiatives. For example, the SEC adopted disclosure requirements in 2012 relating to the sourcing of certain minerals from the Democratic Republic of Congo and certain other adjoining countries. These rules, which required reporting starting in 2014, could adversely affect our costs, the availability of minerals used in our products, and our relationships with customers and suppliers. Also, since our supply chain is complex, we may face reputational challenges with our customers, stockholders, and other stakeholders if we are unable to sufficiently verify the origins for any conflict minerals used in the products that we sell.

New or future changes to U.S. and non-U.S. tax laws could materially adversely affect us.

New or future changes in tax laws, regulations, and treaties, or the interpretation thereof, in addition to tax regulations enacted but not in effect, tax policy initiatives and reforms under consideration in the United States or related to the Organization for Economic Co-operation and Development's ("OECD"), Base Erosion and Profit Shifting Project ("BEPSP"), the European Commission's state aid investigations, and other initiatives could have an adverse effect on the taxation of international businesses. Furthermore, countries where we are subject to taxes, including the United States, are independently evaluating their tax policy and we may see significant changes in legislation and regulations concerning taxation. Certain countries have already enacted legislation, including those related to BEPSP, which could affect international businesses, and other countries have become more aggressive in their approach to audits and enforcement of their applicable tax laws. In addition, we are unable to predict what future tax reform may be proposed or enacted or what effect such changes would have on our business, but any changes, to the extent they are brought into tax legislation, regulations, policies, or practices, could increase our effective tax rates in the countries where we have operations and have an adverse effect on our overall tax rate, along with increasing the complexity, burden and cost of tax compliance, all of which could impact our business, financial condition, and results of operations.

If we fail to comply with government contracting regulations, we could suffer a loss of revenue or other penalties.

Some of our revenue is derived from contracts with agencies of the U.S. government and subcontracts with its prime contractors. As a result, we are subject to federal contracting regulations, including the Federal Acquisition Regulations. In connection with our business with the U.S. government, we are also subject to audits and review and approval of our policies, procedures, and internal controls for compliance with procurement regulations and applicable laws. In certain circumstances, if we do not comply with the terms of a government contract or with regulations or statutes, we could be subject to downward contract price adjustments or refund obligations or could in extreme circumstances be assessed civil and criminal penalties or be debarred or suspended from obtaining future contracts for a specified period of time, which could have an adverse effect on our business.

Tax regulatory authorities may disagree with our positions and conclusions regarding certain tax positions resulting in unanticipated costs or non-realization of expected benefits.

A tax authority may disagree with tax positions that we have taken. For example, the Internal Revenue Service ("IRS"), or another tax authority could challenge our allocation of income by tax jurisdiction and the amounts paid between our affiliated companies pursuant to our intercompany arrangements and transfer pricing policies, including amounts paid with respect to our intellectual property in connection with our intercompany research and development cost sharing arrangement and legal structure. A tax authority may take the position that material income tax liabilities, interest, and penalties are payable by us, in which case, we expect that we might contest such assessment. Contesting such an assessment may be lengthy and costly and if we were unsuccessful in disputing the assessment, the implications could be materially adverse to us and affect our anticipated effective tax rate or operating income, and we could be required to pay substantial penalties and interest where applicable.

Catastrophic events may disrupt our business.

Our corporate headquarters and some of our suppliers and foundry vendors are located in areas that are in active earthquake zones or are subject to power outages, natural disasters, political, social, or economic unrest, and other potentially catastrophic events. In the event of a major earthquake, hurricane, flooding, or other catastrophic event such as fire, power loss, telecommunications failure, cyber-attack, war, terrorist attack, political, social, or economic unrest, or disease outbreak, such as the COVID-19 pandemic, we may be unable to continue our operations and may endure system interruptions, reputational harm, delays in our product development, breaches of data security, or loss of critical data, any of which could have an adverse effect on our future results of operations.

State, federal, and foreign laws and regulations related to privacy, data use, and security could adversely affect us.

We are subject to state and federal laws and regulations related to privacy, data use, and security. In addition, in recent years, there has been a heightened legislative and regulatory focus on data security, including requiring consumer notification in the event of a data breach. Legislation has been introduced in Congress and there have been several Congressional hearings addressing these issues. From time to time, Congress has considered, and may do so again, legislation establishing requirements for data security and response to data breaches that, if implemented, could affect us by increasing our costs of doing business. In addition, several states have enacted privacy or security breach legislation requiring varying levels of consumer notification in the event of a security breach. For example, California passed the California Consumer Privacy Act ("CCPA"), which enhances consumer protection and privacy rights by granting consumers resident in California new rights with respect to the collection of their personal data and imposing new operational requirements on businesses, and went into effect in January 2020. The CCPA includes a statutory damages framework and private rights of action against businesses that fail to comply with certain CCPA terms or implement reasonable security procedures and practices to prevent data breaches. Additionally, in November 2020, California voters passed the California Privacy Rights Act of 2020 ("CPRA") which went into effect in January 2023. The CPRA imposes additional obligations on companies covered by the legislation and will significantly modify the CCPA, including by expanding the CCPA with additional data privacy compliance requirements that may impact our business. Several other states are considering similar legislation.

Foreign governments are raising similar privacy and data security concerns. In particular, the European Union has enacted a General Data Protection Regulation ("GDPR"), which became effective in May 2018. China, Russia, Japan, and other countries in Latin America and Asia are also strengthening their privacy laws and the enforcement of privacy and data security requirements. Complying with such laws and regulations may be time-consuming and require additional resources, and could therefore adversely affect our business, financial condition, and results of operations.

Breaches or other disruptions of our security systems may damage our reputation and adversely affect our business.

Our security systems are designed to protect our and our customers', suppliers', and employees' confidential information, as well as maintain the physical security of our facilities. We continue to assess and improve the quality of our networks, endpoints, security systems, and policies and procedures related to cybersecurity risks and incidents. We are not aware of any past cybersecurity incidents that have materially impacted our business. We may not have current capability to detect new or unknown security vulnerabilities. Cybersecurity threats, which include computer viruses, spyware, malware, ransomware, attempts to access information, denial of service attacks, and other electronic security breaches, are persistent and evolve quickly. Such threats have recently increased in frequency, scope, magnitude, and cost. Since the techniques used to obtain unauthorized access or to sabotage systems change frequently and are often not recognized until after they are launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. Accidental or willful security breaches or other unauthorized access by third parties to our information systems or facilities, or the existence of computer viruses in our data or software, could expose us to a risk of information loss, misappropriation of proprietary and confidential information, as well as work stoppages or disruptions.

We also rely on third-party cloud-based service providers of corporate infrastructure services relating to, among other things, human resources, electronic communication services, and finance functions, and we are, of necessity, dependent on the security systems of these providers. These technologies are subject to failure, including as a result of an inability to have such technologies properly supported, updated, expanded, or integrated into other technologies. These technologies may also contain open source and third-party software which may unbeknownst to us contain defects or viruses.

Any security breaches or other unauthorized access by third parties to the systems of our cloud-based service providers or the existence of computer viruses in their data or software could expose us to a risk of information loss and misappropriation of confidential information.

Any loss, theft, or misuse of this information could result in, among other things, unfavorable publicity, damage to our reputation, difficulty in marketing our products, allegations by our customers that we have not performed our contractual obligations, regulatory fines or penalties, litigation by affected parties, and possible financial obligations for liabilities and damages related to the theft or misuse of this information, any of which could have an adverse effect on our business, financial condition, results of operations, reputation, and relationships with our customers and suppliers.

Our business may be impacted by information technology system failures or network disruptions, and lack of redundancy.

Our ability to operate our business depends on the efficient operation of internal and third-party information technology systems, including cloud computing, data centers, hardware, software, and applications, to manage our company. We strive to use quality and secure systems, work with reputable system vendors, and implement procedures intended to enable us to protect our systems.

Our information technology systems and operations could be damaged or interrupted due to events such as natural or human-caused disasters, extreme weather, geopolitical events and security issues, computer viruses, cybersecurity incidents, telecommunication failures, and similar events, which could adversely affect our business, financial condition, and results of operations. Our systems are not fully redundant and depending on the severity of the damage or interruption, our disaster recovery plans may be inadequate or ineffective. These events could also damage our reputation, and result in increased costs or loss of sales.

We might not be able to utilize a significant portion of our net operating loss carryforwards and research and development tax credit carryforwards.

As of December 31, 2022, we had U.S. federal, state and foreign net operating loss ("NOL"), carryforwards of approximately $213.3 million, $65.3 million and $1.7 million, respectively, and U.S. federal and state research and development tax credit carryforwards of approximately $3.9 million and $3.6 million, respectively. The U.S. federal NOL carryforwards begin to expire in 2025, the state NOL carryforwards begin to expire in 2028, and the foreign NOL carryforwards begin to expire in 2028. The U.S. federal research and development tax credit carryforwards begin to expire in 2025 and the state research and development tax credit carryforwards carry forward indefinitely. These net operating loss and U.S. federal tax credit carryforwards could expire unused and/or be unavailable to offset future income tax liabilities. In addition, under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), and corresponding provisions of California state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income may be limited. We completed a Section 382 analysis and determined an ownership change occurred in 2014 and concluded that it had no impact on U.S. federal and California net operating losses or on U.S. federal research and development credits. Our initial public offering in November 2019 did not result in a change in ownership of greater than 50% under Section 382. We also had a follow-on offering on June 16, 2020, which resulted in greater than 50% change under Section 382. We completed an updated Section 382 analysis based on this new change event and determined that it will not prohibit us from eventually utilizing our carryforwards. We updated the Section 382 analysis through December 31, 2022 and concluded there have not been any additional ownership changes as defined under Section 382 since the June 16, 2020 follow-on offering. We may experience ownership changes in the future as a result of subsequent shifts in our stock ownership, some of which may be outside of our control. If we determine that an ownership change has occurred and our ability to use our historical net operating loss and tax credit carryforwards is materially limited, it would harm our future business, financial condition, and results of operations by effectively increasing our future tax obligations. In addition, under the Tax Act, federal NOLs incurred in 2018 and in future years may be carried forward indefinitely but generally may not be carried back and the deductibility of such NOLs is limited to 80% of taxable income. Under the CARES Act, which was signed into law in 2020, an NOL from a tax year beginning in 2018, 2019 or 2020 can be carried back five years and would not be subject to the 80%-of-income limitation if they are exhausted during the five-year carryback period or during 2018, 2019 or 2020. The Company will not carry back any NOLs as they did not have taxable income in prior years.

Risks Related to 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 technologies and proprietary 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 the misappropriation, infringement, or other violation of our proprietary information or infringement of our intellectual property rights, and our ability to prevent such misappropriation, infringement, or other violation is uncertain, particularly in countries outside of the United States. As of December 31, 2022, we had 99 issued U.S. patents, expiring generally between 2026 and 2039 and 43 pending U.S. patent applications (including 12 provisional applications). We also had three foreign issued patents expiring in 2036 and four pending foreign patent applications. Our issued patents and pending patent applications generally relate to our MEMS fabrication process, MEMS resonators, circuits, packaging, and oscillator systems. We cannot assure you that any patents from any pending patent applications (or from any future patent applications) will be issued, and even if the pending patent applications are granted, the scope of the rights granted to us may not be meaningful or provide us with any commercial advantage. For example, these patents could be opposed, contested, circumvented, designed around by third parties, be narrowed or declared invalid or unenforceable in judicial or administrative proceedings including re-examination, inter partes review, post-grant review, interference and derivation proceedings and equivalent proceedings in foreign jurisdictions, or be subject to ownership claims by third parties. The failure of our patents to adequately protect our technology might make it easier for our competitors to offer similar products or technologies. Our foreign patent protection is less comprehensive than our U.S. patent protection and may not protect our intellectual property rights in some countries where our products are sold or may be sold in the future. Even if foreign patents are granted, effective enforcement in foreign countries may not be available. Further, we are currently unable to take advantage of selling our products online in certain countries where we do not own trademarks for our corporate name. Many U.S.-based companies have encountered substantial third-party intellectual property infringement in foreign countries, including countries where we sell products. 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, and results of operations could be adversely affected.

The legal standards relating to the validity, enforceability, and scope of protection of intellectual property rights are uncertain and evolving. We cannot assure you that others will not develop or patent similar or superior technologies or solutions, or that our patents, trademarks, and other intellectual property will not be challenged, invalidated, or circumvented by others.

We also have a license to certain patents from Bosch relating to the design and manufacture of MEMS-based timing applications. The patent rights obtained under the license agreement expire between 2021 and 2029, and the license agreement expires upon expiration of the last patent licensed under the agreement. We do not believe there will be any significant impact upon expiration of these patents.

We believe that the success of our business depends more on proprietary technology, information and processes, and know-how than on our patents or trademarks. Much of our proprietary information and technology related to manufacturing processes is not patented and may not be patentable.

Unauthorized copying or other misappropriation of our proprietary technologies could enable third parties to benefit from our technologies without paying us for doing so, which could harm our business. Monitoring unauthorized use of our intellectual property is difficult and costly. It is possible that unauthorized use of our intellectual property may have occurred or may occur without our knowledge. We cannot assure you that the steps we have taken will prevent unauthorized use of our intellectual property, or that others will not develop technologies similar or superior to our technology or design around our intellectual property. Our failure to effectively protect our intellectual property could reduce the value of our technology in licensing arrangements or in cross-licensing negotiations.

In addition, we also rely on contractual protections with our customers, suppliers, distributors, employees, and consultants, and we implement security measures designed to protect our trade secrets and know-how. However, we cannot assure you that we have entered into such agreements with every such party, that these contractual protections and security measures will not be breached, that we will have adequate remedies for any such breach, or that our customers, suppliers, distributors, employees, or consultants will not assert rights to intellectual property or damages arising out of such contracts.

We may in the future need to initiate infringement claims or litigation in order to try to protect or enforce our intellectual property rights. Litigation, whether we are a plaintiff or a defendant, can be expensive and time-consuming and may divert the efforts of our management and other personnel, 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 issuing. Additionally, any enforcement of our patents or other intellectual property may provoke third parties to assert counterclaims against us. If we are unable to meaningfully protect our proprietary rights or if third parties independently develop or gain access to our or similar technologies, our business, financial condition, results of operations, reputation, and competitive position could be harmed.

We may face intellectual property infringement, misappropriation, or other claims, which could be time-consuming and costly to defend or settle and which could result in the loss of significant rights and harm our relationships with our customers and distributors.

The semiconductor industry in which we operate is characterized by companies that hold patents and other intellectual property rights and vigorously pursue, protect, and enforce intellectual property rights. From time to time, third parties may assert against us and our customers and distributors their patent and other intellectual property rights to technologies that are important to our business. For example, in March 2019, VTT Technical Research Centre of Finland, Ltd. filed suit in the United States District Court for the Northern District of California alleging infringement by us of a patent. The District Court ruled in our favor, VTT filed an appeal with the U.S. Court of Appeals for the Federal Circuit (“CAFC”), on June 9, 2021, a hearing was held at the CAFC, and on June 10, 2021 the CAFC affirmed the District Court’s judgment. Any litigation, regardless of success or merit, could cause us to incur substantial expenses, reduce our sales, and divert the efforts of our management and other personnel. In the event we receive an adverse result in any litigation, we could be required to pay substantial damages, seek licenses from third parties, which may not be available on reasonable terms or at all, cease sale of products, expend significant resources to develop alternative technology, or discontinue the use of processes requiring the relevant technology.

In addition, our commercial success depends upon our ability to manufacture and sell our products without infringing, misappropriating, or otherwise violating the intellectual property rights of others. Claims that our products, processes, or technology infringe, misappropriate, or otherwise violate third-party intellectual property rights, regardless of their merit or resolution, could be costly to defend or settle and could divert the efforts and attention of our management and other personnel. We may in the future, particularly as a public company with an increased profile and visibility, receive communications from others alleging our infringement, misappropriation, or other violation of patents, trade secrets, or other intellectual property rights. We cannot assure you that, if made, these claims will not be successful, and lawsuits resulting from such allegations, even if we believe they are invalid, could subject us to significant liability for damages, invalidate our proprietary rights, and prevent us from selling specific products. Moreover, there could be public announcements of the results of hearings, motions, or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

Intellectual property claims could also harm our relationships with our customers or distributors and might deter future customers from doing business with us. We do not know whether we will prevail in any such proceedings given the complex technical issues and inherent uncertainties in intellectual property litigation. If any future proceedings result in an adverse outcome, we could be required to:

- cease the manufacture, use or sale of the applicable products, processes, or technology;
- pay substantial damages for infringement by us or our customers;
- expend significant resources to develop non-infringing products, processes, or technology, which may not be successful;
- license technology from the third-party claiming infringement, which license may not be available on commercially reasonable terms, or at all;
- cross-license our technology to a competitor to resolve an infringement claim, which could weaken our ability to compete with that competitor;
- lose the opportunity to license our technology to others or to collect royalty payments based upon successful protection and assertion of our intellectual property rights against others; or
- pay substantial damages to our customers or end users to discontinue their use of or to replace infringing technology sold to them with non-infringing technology, if available.

Any of the foregoing results could adversely affect our business, financial condition, and results of operations.

Any potential dispute involving 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 patents or other intellectual property, our customers could also become the target of litigation. Our agreements with customers and other third-parties generally include indemnification or other provisions under which we agree to indemnify or otherwise be liable to them for losses suffered or incurred as a result of claims of intellectual property infringement, damages caused by us to property or persons, or other liabilities relating to or arising from our solutions included in their products. Large indemnity payments or damage claims from contractual breach could harm our business, financial condition, and results of operations. From time to time, customers may require us to indemnify or otherwise be liable to them for breach of confidentiality or failure to implement adequate security measures with respect to their intellectual property and trade secrets. Although we normally contractually limit our liability with respect to such obligations, we may still incur substantial liability related to them. Any litigation against our customers could trigger technical support and indemnification obligations under some of our agreements, which could result in substantial expense to us.

In addition, other customers, or end customers with whom we do not have formal agreements requiring us to indemnify them may ask us to indemnify them if a claim is made as a condition to awarding future design wins to us. Because some of our customers 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 customers that could increase our expenses, disrupt our ability to sell our solutions and reduce our revenue and profit. Any dispute with a customer with respect to such obligations could have adverse effects on our relationship with that customer and other current and prospective customers and reduce demand for our solutions. 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. Any of the foregoing could harm our business, financial condition, and results of operations.

Risks Related to MegaChips Corporation's Ownership Position in Our Common Stock

As long as MegaChips holds a significant amount of our stock, our other shareholders' ability to influence matters requiring stockholder approval will be limited.

MegaChips owns 5,000,000 shares of our common stock, representing approximately 23.0% of our outstanding common stock as of December 31, 2022. For so long as MegaChips or its successors in interest continue to hold the largest ownership position in our outstanding common stock, we expect MegaChips to continue to hold at least one out of eight seats on our board of directors, and to be influential in electing members of our board of directors. As long as MegaChips continues to be our largest stockholder, it will continue to have significant influence over us.

For example, as long as MegaChips continues to hold a significant or the largest ownership position in our outstanding common stock, MegaChips may have the ability to affect the outcome of any stockholder vote during this period. As a result, MegaChips will have the ability to exert significant influence over many matters affecting us, either through its board representative or as a stockholder, including:

- determinations with respect to our business plans and policies, including the appointment and removal of our officers;
- any determinations with respect to mergers and other business combinations;
- our acquisition or disposition of assets;
- our financing activities;
- the allocation of business opportunities that may be suitable for us and MegaChips;
- the payment of dividends on our common stock; and
- the number of shares available for issuance under our stock plans.

MegaChips' voting control may discourage transactions involving a change of control of us, including transactions in which other holders of our common stock might otherwise receive a premium for their shares over the then current market price. In addition, as a result of this voting control and representations on our board of directors, persons who we would like to invite to join our board of directors may decline to do so.

Our inability to resolve any disputes that arise between us and MegaChips with respect to our past and ongoing relationships may adversely affect our operating results.

Disputes may arise between MegaChips and us in a number of areas relating to our past and ongoing relationships, including:

- sales or distributions by MegaChips of all or any portion of its ownership interest in us; and
- business opportunities that may be attractive to both MegaChips and us.

We may not be able to resolve any potential conflicts, and even if we do, the resolution may be less favorable than if we were dealing with an unaffiliated party.

We have entered into an integration and purchase agreement with MegaChips for the sale of resonators by us to MegaChips. The agreements we entered into with MegaChips may be amended upon agreement between the parties. Because MegaChips is a major stockholder with representatives on our board of directors, we may not have the leverage to negotiate amendments to these agreements on terms as favorable to us compared to those we would negotiate with an unaffiliated third party.

There could be potential conflicts of interest between us and affiliates of MegaChips, which could impact our business and operating results.

Some of our directors have or had affiliations with MegaChips. Affiliations of directors with MegaChips could create, or appear to create, conflicts of interest with respect to matters involving both us and MegaChips. For example, corporate opportunities may arise that concern both of our businesses, such as the potential acquisition of a particular business or technology that is complementary to both of our businesses. Our Board has adopted a Related Persons Transactions Policy to address actual or perceived conflicts of interest of directors, officers and greater than 5% stockholders on a case-by-case basis. If any corporate opportunity arises and if our directors and officers do not pursue it on our behalf, we may not become aware of, and may potentially lose, a significant business opportunity.

Risks Related to Our Common Stock

Substantial future sales of our common stock could cause the market price of our common stock to decline.

The market price of our common stock could decline as a result of substantial sales of our common stock, particularly sales by our directors, executive officers, and significant stockholders, including MegaChips, or the perception in the market that holders of a large number of shares intend to sell their shares.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us more difficult, limit attempts by our stockholders to replace or remove our current management and limit the market price of our common stock.

Provisions in our certificate of incorporation and bylaws may have the effect of delaying or preventing a change of control or changes in our management. Our amended and restated certificate of incorporation and bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, shares of undesignated preferred stock with terms, rights, and preferences determined by our board of directors that may be senior to our common stock;
- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, the Chairman of our board of directors, or our Chief Executive Officer;
- establish an advance notice procedure for stockholder proposals to be brought before an annual meeting, including proposed nominations of persons for election to our board of directors;
- establish that our board of directors is divided into three classes, with each class serving three-year staggered terms;
- prohibit cumulative voting in the election of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled by a majority of directors then in office, even if less than a quorum; and
- require the approval of our board of directors or the holders of at least 66 2/3% of our outstanding shares of capital stock to amend our bylaws and certain provisions of our certificate of incorporation.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which generally prohibits a Delaware corporation from engaging in any of a broad range of business combinations with any interested stockholder for a period of three years following the date on which the stockholder became an interested stockholder. Any delay or prevention of a change of control transaction or changes in our management could cause our stock price to decline.

Our bylaws designate the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, and federal district courts will be the sole and exclusive forum for Securities Act claims, which could limit our stockholders' ability to obtain what they believe to be a favorable judicial forum for disputes with us or our directors, officers, or other employees.

Our bylaws provide that, unless we consent in writing to the selection of an alternative forum, to the fullest extent permitted by law, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (a) any derivative action or proceeding brought on our behalf, (b) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, or other employees to us or our stockholders, (c) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws, or (d) any action asserting a claim against us governed by the internal affairs doctrine. Section 27 of the Securities Exchange Act of 1934, or the Exchange Act, creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. As a result, the exclusive forum provision will not apply to suits brought to enforce any duty or liability created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. Our bylaws further provide that, unless we consent in writing to the selection of an alternative forum, the federal district courts are the sole and exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act.

Any person or entity purchasing or otherwise acquiring any interest in our capital stock shall be deemed to have notice of and consented to the provisions of our bylaws described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage such lawsuits against us and our directors, officers, or other employees. Alternatively, if a court were to find these provisions of our bylaws inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business, financial condition, and results of operations and result in a diversion of the time and resources of our management and board of directors.

Our stock price may be volatile and may decline, resulting in a loss of some or all of our stockholder investment.

The trading price and volume of our common stock is likely to be volatile and could fluctuate significantly in response to numerous factors, many of which are beyond our control, including:

- macroeconomic conditions,
- actual or anticipated fluctuations in our results of operations due to, among other things, changes in customer demand, product life cycles, pricing, ordering patterns, and unforeseen operating costs;
- the financial projections we may provide to the public, any changes in these projections, or our failure to meet these projections;
- announcements with respect to developments, status, and impact on us, our competition, our constituents, and our suppliers of the COVID 19 global pandemic;
- failure of securities analysts to initiate or maintain coverage of us, changes in financial estimates or ratings by any securities analysts who follow us, or our failure to meet these estimates or the expectations of investors;
- announcements by our significant customers of changes to their product offerings, business plans, or strategies;
- announcements by us or our competitors of significant technical innovations, acquisitions, strategic partnerships, joint ventures, or capital commitments;
- changes in operating performance and stock market valuations of other technology companies generally, or those in the semiconductor industry;
- timing and seasonality of the end-market demand;
- cyclical fluctuations in the semiconductor market;
- price and volume fluctuations in the overall stock market from time to time, including as a result of trends in the economy as a whole;
- actual or anticipated developments in our business or our competitors' businesses or the competitive landscape generally;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- any major change in our management;
- lawsuits threatened or filed against us; and
- other events or factors, including those resulting from war, incidents of terrorism, the COVID-19 pandemic, or responses to these events.

In addition, the market for technology stocks and the stock markets in general have experienced extreme price and volume fluctuations. Stock prices of many technology companies have fluctuated in a manner unrelated or disproportionate to the operating performance of those companies. In the past, stockholders have instituted securities class action litigation following periods of market volatility. If we were to become involved in securities litigation, it could subject us to substantial costs, divert resources and the attention of management from our business, and adversely affect our business, financial condition, and results of operations.

Item 1B. Unresolved Staff Comments.

None

Item 2. Properties.

Our principal executive offices are located in a leased facility in Santa Clara, California, consisting of approximately 50,400 square feet of office space under lease that expires in March 2027. This facility accommodates our principal engineering, sales, marketing, operations, finance, and administrative activities. We also lease offices in Michigan, Japan, Malaysia, the Netherlands, Taiwan, Finland, and Ukraine. We do not own any real property. We believe that our leased facilities are adequate to meet our current needs and that additional facilities will be available on commercially reasonable terms for lease to meet future needs.

Item 3. Legal Proceedings.

From time to time, we may become involved in legal proceedings arising in the ordinary course of our business. We are not currently a party to any legal proceedings the outcome of which, if determined adversely to us, would individually or in the aggregate have a material adverse effect on our business, financial condition, and results of operations.

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 for Common Stock

Our common stock has been quoted on the Nasdaq Global Market under the symbol "SITM" since our initial public offering in November 2019. Prior to that time, there was no public market for our common stock.

As of February 9, 2023, there were 20 holders of record (not including beneficial holders of stock held in street names) of our common stock.

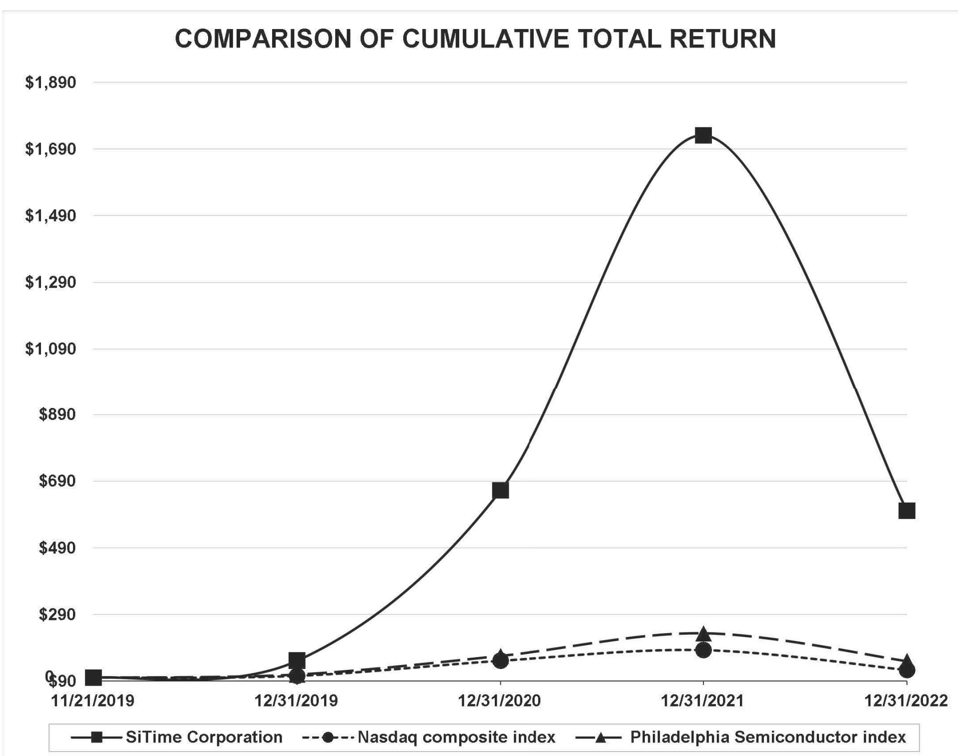
Dividend Policy

We have never paid any cash dividends on our common stock. Our board of directors currently intends to retain any future earnings to support operations and to finance the growth and development of our business and does not intend to pay cash dividends on our common stock for the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our board.

Stock Performance Graph

The following information shall not be deemed to be soliciting material or to be filed with the SEC, or subject to Regulations 14A or 14C under the Exchange Act or to the liabilities of Section 18 of the Exchange Act nor shall such information be incorporated by reference into any future filing under the Securities Act or the Exchange Act, except to the extent that we specifically incorporate it by reference into such filing.

The following line graph compares for the period beginning November 21, 2019, the initial trading date of our common stock on the Nasdaq Global Market, and ending on December 31, 2022, the last day of our fiscal year, the cumulative total stockholder return for our common stock, the Nasdaq Composite Index and Philadelphia Semiconductor Index and assumes reinvestment of any dividends. The stockholder return shown in the graph below is not necessarily indicative of, nor is it intended to forecast, the potential future performance of our common stock, and we do not make or endorse any predictions as to future stockholder returns.



Company Name/Index	Base Period 11/21/2019	December 31, 2019	December 31, 2020	December 31, 2021	December 31, 2022
SiTime Corporation	100.00	150.89	662.31	1,731.01	601.30
Nasdaq composite index	100.00	105.22	151.13	183.46	122.73
Philadelphia Semiconductor index	100.00	109.24	165.10	233.06	149.55

Item 6. [Reserved]

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

The Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") should be read in conjunction with the financial statements and the notes thereto included elsewhere in this Annual Report on Form 10-K. The MD&A contains forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act that involve risks and uncertainties, which are discussed under Item 1A.

Overview

We are a leading provider of precision timing solutions to the global electronics industry. Our precision timing solutions are the heartbeat of our customers' electronic systems, providing the timing functionality that is needed for electronics to operate reliably and correctly. We provide solutions that are differentiated by high performance, high resilience, and high reliability, along with programmability, small size, and low power consumption. Our products have been designed into over 300 applications across our target markets, including communications and enterprise, automotive, industrial, aerospace, mobile, IoT and consumer.

In 2022, we advanced our technology, expanded our product portfolio, increased our worldwide workforce, and generated a significant increase in revenue and profit. We saw continued strong revenue growth, increased gross margins and positive operating cash flow, but decreased operating margins. Our revenue has historically been subject to some seasonal variation. Based on the production schedules of key customers, our products typically see stronger revenue in the second half of our fiscal year. However, this was not the case in 2022 and there can be no assurance that this trend will occur in future years. Revenue grew 30% from $218.8 million in 2021 to $283.6 million in 2022. Gross margins increased from 64% in 2021 to 65% in 2022, while operating margins decreased from a 15% income in 2021 to a 6% income in 2022.

Commercial shipments of SiTime's first oscillator products began in 2006. Historically, our revenue has been substantially delivered from sales of oscillator systems across our target end markets. In addition to oscillator systems, we have expanded our products to include clock IC and timing sync solutions. We seek to expand our presence in our end markets across all product categories.

We sell our products primarily through distributors, who in turn sell to our end customers. We also sell products directly to some of our end customers. Based on sell-through information provided by our distributors, we believe the majority of our end customers are based in the U.S. We leverage our global network of distributors to address the broad set of end markets we serve. For our largest accounts, dedicated sales personnel work with the end customer to ensure that our solutions fully address the end customer's timing needs. Our smaller customers can select the optimum timing solution for their needs by working directly with our distributors or by shopping on our online store, SiTimeDirect™.

We operate a fabless business model, allowing us to focus on the design, sales, and marketing of our products, quickly scale production, and significantly reduce our capital expenditures. This model also allows us to operate with lower capital expenditure investment than other semiconductor companies who own fabs. A fabless infrastructure gives us production flexibility and the ability to scale capacity up and down quickly to meet demand. Our programmable architecture also plays a key role in ensuring optimal production flexibility, as it allows us to offer shorter lead times and the ability to meet custom requirements more easily.

We were acquired by MegaChips in 2014 and were a wholly-owned subsidiary of MegaChips, a fabless semiconductor company based in Japan and traded on the Tokyo Stock Exchange, until November 25, 2019. On November 25, 2019, we completed the initial public offering of shares of our common stock. In June 2020, we completed a follow-on public offering, in which we issued and sold 1,525,000 shares of our common stock and MegaChips sold 2,500,000 shares of our common stock held by it. In February 2021, we completed an additional follow-on public offering, in which we issued and sold 1,500,000 shares of our common stock and MegaChips sold 1,500,000 shares of our common stock held by it. In November 2021 we completed a follow-on public offering, in which we issued and sold 1,300,000 shares of our common stock and MegaChips sold 1,000,000 shares of our common stock held by it. In May 2022, the Company entered into a Sales Agreement ("Sales Agreement") with Stifel, Nicolaus & Company, Incorporated ("Stifel"), under which we may offer and sell from time to time at our sole discretion, up to an aggregate of 800,000 shares of our common stock, par value $0.0001 per share, through Stifel as our sales agent. During the year ended December 31, 2022, we sold 225,334 shares of our common stock under the Sales Agreement. MegaChips continues to be our largest stockholder and held approximately 23.0% of our common stock as of December 31, 2022.

There have been a number of industry-wide supply constraints affecting the supply of analog circuits manufactured by certain foundries, including Taiwan Semiconductor Manufacturing Company, and affecting outsourced semiconductor assembly and test providers. We believe that the effects of the industry-wide supply constraints on other timing device suppliers contributed in part to our revenue and gross margin growth in 2021 and the first half of 2022, however, we do not expect be able to sustain these revenue and gross margin increases in 2023. In addition, macroeconomic events such as rising inflation, fear of recession, equity market volatility, geopolitical tensions, war, decreased consumer spending, lower demand for electronic products following a period of strong demand during the COVID-19 pandemic, supply chain disruptions, and the COVID-19 pandemic measures implemented in China, harmed sales of our products and results of operations in 2022 and we expect will continue to do so in 2023. We believe that some of our customers built up inventory in our products in 2022 to overcome the industry-wide supply constraints that occurred in the previous periods and that the macroeconomic events in 2022 have led to reduced demand for our customers' products, which led to an inventory buildup at some of our customers and their affiliates, partners and contract manufacturers, which has adversely affected sales of our products. We believe that this inventory buildup will negatively impact the sales of our products until such inventory buildup is reduced. The inventory buildup at some of our customers and their affiliates, partners, and contract manufacturers could result in significant decreases in our sales, margins, and could materially harm our results of operations. The future effects of macroeconomic events on our business and results of operations, including inventory levels at our customer and their affiliates, partners, and contract manufacturers as well as demand for our products, are uncertain and difficult to predict. For additional discussion please see Part I, Item 1A Risk Factors of this report, especially the risk factor titled “Global macroeconomic conditions have harmed and may continue to harm our business” and “Our revenue and operating results may fluctuate from period to period, which could cause our stock price to fluctuate.”

Impact of COVID-19 on our Business

The COVID-19 pandemic continued to impact our workforce and the operations of our customers and suppliers during 2022. In response to the COVID-19 pandemic and related government measures, we implemented safety measures to protect our employees and contractors at our locations around the world.

The effects of the ongoing COVID-19 pandemic on our business are evolving and difficult to predict. The ultimate impact of the COVID-19 pandemic on our business, results of operations, and financial condition continues to depend on future developments which are not within our control and cannot be accurately predicted and are uncertain, including the duration, scope and severity of the pandemic, any additional resurgences, variants and the severity of variants, and the ability to effectively and widely manufacture and distribute vaccines.

Key Factors Affecting Our Performance

Customer Orders and Forecasts

Because our sales are made pursuant to standard purchase orders, orders may be cancelled, reduced, or rescheduled with little or no notice and without penalty. Cancellations of orders could result in the loss of anticipated sales without allowing us sufficient time to reduce our inventory and operating expenses. In addition, changes in forecasts or the timing of orders from customers exposes us to the risks of inventory shortages or excess inventory. We may not be able to fulfill increased demand, at least in the short term, as we do not intend to acquire excess inventory to pre-build custom products.

Design Wins with New and Existing Customers

Our solutions enable our customers to differentiate their product offerings and position themselves to gain market share. We work closely with our customers to understand their product roadmaps and strategies. Our end customers continuously develop new products in existing and new application areas. We also consider design wins critical to our future success and anticipate being increasingly dependent on revenue from new design wins for our new higher-end products with higher average selling prices (“ASPs”). The selection process is typically lengthy and may require us to incur significant design and development expenditures in pursuit of a design win with no assurance that our solutions will be selected. As a result, the loss of any key design win or any significant delay in the ramp of volume production of the customer’s products into which our product is designed could adversely affect our business.

Customer Demand and Product Life Cycles

Once customers design our precision timing solutions into their products, we closely monitor all aspects of their demand cycle, including the initial design phase, prototype production, volume production, and inventories, as well as end-market demand, including seasonality, cyclicality, and the competitive landscape. Given our customer relationships and the long-term aspects of our solutions, we benefit from visibility into customer demand. This in turn provides an opportunity for us to monitor and refine our business fundamentals.

Product Adoption within New Markets and Applications

As we evaluate new market opportunities and bring new products to market, we pay particular attention to forecasts by industry analysts and the adoption curve of technology. We also analyze in detail potential competing forces that could hinder such adoption. If we fail to anticipate or respond to technological shifts or market demands, or to timely develop new or enhanced products or technologies in response to the same, it could result in decreased revenue and the loss of our design wins to our competitors.

Pricing, Product Cost, and Product Mix

The ASPs of our products vary significantly. While the ASP of any individual product generally decreases over time, our average ASPs have historically remained relatively flat as we continue to introduce new higher-end products with higher ASPs. Our pricing and margins depend on customer demand as well as the volumes and the features of the timing devices we provide to our customers. We continually monitor and work to reduce the cost of our products and improve the potential value our solutions provide to our customers as we target new design win opportunities and manage the product life cycles of our existing customer designs. Since we rely on third-party wafer foundries and assembly and test contractors to manufacture, assemble, and test our products, we maintain a close relationship with our suppliers to improve quality and increase yields.

Gross margin, or gross profit as a percentage of revenue, has been, and will continue to be, affected by a variety of factors, including ASPs, and product mix in a given period, material costs, yields, inventory write-downs and manufacturing operations costs. We believe the primary driver of gross margin is the ASPs negotiated between us and our customers relative to material costs and yield improvement. As our products mature and unit volumes increase, we expect their ASPs to decline. These declines often coincide with improvements in manufacturing yields and lower wafer, assembly, and testing costs, which offset some or all of the margin reduction that results from lower ASPs. However, we expect our gross margin to fluctuate on a quarterly basis as a result of changes in ASPs due to new product introductions, existing product transitions into high-volume manufacturing, manufacturing costs, and our product mix.

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. The industry experienced a significant downturn during past adverse macroeconomic events such as global recessions, and we are currently experiencing a decrease in demand for our products. Downturns in the semiconductor industry have been characterized by diminished product demand, production overcapacity, high inventory levels, and accelerated erosion of average selling prices. Any prolonged or significant downturn in the semiconductor industry generally could adversely affect our business and reduce demand for our products and otherwise harm our business, financial condition and results of operations. In the last few years, the semiconductor industry experienced an upturn. However, this was not the case in second half of 2022 and as a result sales of our products declined in the second half of 2022. Any significant upturn in the semiconductor industry could result in increased competition for access to third-party foundry and assembly capacity. We are dependent on the availability of this capacity to manufacture and assemble our products and we can provide no assurance that adequate capacity will be available to us in the future. We cannot predict the duration or timing of any downturn or upturn in the semiconductor industry.

Results of Operations

The following table summarizes our results of operations for the periods presented.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands, except percentage)				
Revenue	$ 283,605	$ 218,808	$ 116,156	$ 64,797	30%
Cost of revenue	100,643	79,346	58,224	21,297	27%
Gross profit	182,962	139,462	57,932	43,500	31%
Operating expenses:					
Research and development	90,288	52,104	31,652	38,184	73%
Selling, general and administrative	76,532	54,515	34,893	22,017	40%
Total operating expenses	166,820	106,619	66,545	60,201	56%
Income (loss) from operations	16,142	32,843	(8,613)	(16,701)	(51%)
Interest income	7,291	—	—	7,291	100%
Other expense, net	(97)	(488)	(758)	391	(80%)
Income (loss) before income taxes	23,336	32,355	(9,371)	(9,019)	(28%)
Income tax expense	(82)	(78)	(1)	(4)	5%
Net income (loss) attributable to common stockholders and comprehensive income	$ 23,254	$ 32,277	$ (9,372)	$ (9,023)	(28%)

A discussion of changes in our results of operations from fiscal 2020 to fiscal 2021 has been omitted from this Form 10-K, but may be found in “Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations” of our Form 10-K for fiscal 2021 filed with the Securities and Exchange Commission on February 25, 2022.

Revenue

We derive revenue primarily from sales of precision timing solutions to distributors who in turn sell to our end customers. We also sell products directly to some of our end customers. Our sales are made pursuant to standard purchase orders which may be cancelled, reduced, or rescheduled, with little or no notice. We recognize product revenue upon shipment when we satisfy our performance obligations as evidenced by the transfer of control of our products to customers. We measure revenue based on the amount of consideration we expect to be entitled to in exchange for products.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands except percentage)				
Revenue	$ 283,605	$ 218,808	$ 116,156	$ 64,797	30%

Revenue increased by $64.8 million, or 30%, for 2022 compared to 2021. The increase was primarily related to an increase in ASPs of our products, a 2% increase in volume of shipments year over year and $2.7 million in revenue recorded from the waiver of accrued customer rebate. The ASP increase was related to change in mix of the higher ASP products we shipped. The increase in sales volume was driven by higher demand for our products from new and existing customers. We do not expect to be able to sustain our revenue growth or ASP increases in 2023 as we face lower demand due to macroeconomic conditions and more pricing pressure.

Our top ten direct customers, including distributors, accounted for approximately 74%, 76% and 80% of net revenues in 2022, 2021, and 2020, respectively. In 2022, 2021, and 2020, three customers, which are distributors of our products, each accounted for more than 10% of our net revenues. International sales represented approximately 88%, 94%, and 93% of net revenues in 2022, 2021, and 2020, respectively.

Cost of Revenue, Gross Profit, and Gross Margin

Cost of revenue consists of wafers acquired from third-party foundries, assembly, packaging, and test cost of our products paid to third-party contract manufacturers, and personnel and other costs associated with our manufacturing operations. Cost of revenue also includes depreciation of production equipment, inventory write-downs, amortization of internally developed software, shipping and handling costs, and allocation of overhead and facility costs. We also include credits for rebates received from foundries to cost of revenue.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands except percentage)				
Cost of Revenue	$ 100,643	$ 79,346	$ 58,224	$ 21,297	27%
Gross Profit	182,962	139,462	57,932	43,500	31%
Gross Margin	65%	64%	50%		

Gross profit increased by $43.5 million in the year ended December 31, 2022 compared to the same period in 2021. Gross profit increased $49.9 million mainly from an increase in ASPs of our products and $2.7 million from the reversal of a customer rebate. This increase was offset by higher other manufacturing and overhead costs of $6.1 million.

Gross margin was higher by 1% in the year ended December 31, 2022 compared to the same period in 2021. The gross margin increased by 2% from higher sales volume and an increase in ASPs and was offset by 1% increase in our other manufacturing costs.

We expect to continue to see increases in our manufacturing costs in fiscal year 2023 due to an industry wide increase in costs. We believe that the effects of the industry-wide supply constraints on other timing device suppliers contributed in part to our gross margin growth in 2021 and the first half of 2022, however we do not expect to be able to sustain these gross margin increases in 2023. Gross margin may fluctuate from time to time due to a variety of factors. For additional discussion please see Part I, Item 1A Risk Factors of this report, especially the risk factor titled “Our gross margins may fluctuate due to a variety of factors, which could negatively impact our results of operations and our financial condition.”

Operating Expenses

Our operating expenses consist of research and development, sales and marketing, and general and administrative expenses. Personnel costs are the most significant component of our operating expenses and consist of salaries, benefits, bonuses, stock-based compensation, and commissions. Our operating expenses also include consulting costs, allocated costs of facilities, information technology, and depreciation.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands except percentage)				
Operating Expenses:					
Research and development	$ 90,288	$ 52,104	$ 31,652	$ 38,184	73%
Selling, general and administrative	76,532	54,515	34,893	22,017	40%
Total operating expenses	$ 166,820	$ 106,619	$ 66,545	$ 60,201	56%

Research and Development

Our research and development efforts are focused on the design and development of precision timing solutions. Our research and development expense consists primarily of personnel costs, which include stock-based compensation, pre-production engineering mask costs, software license and intellectual property expenses, design tools and prototype-related expenses, facility costs, supplies, professional and consulting fees, and allocated overhead costs, which may be offset by non-recurring engineering contra-expenses recorded in certain periods. There is no assurance that we will have non-recurring engineering contra-expense from period to period. We expense research and development costs as incurred. We believe that continued investment in our products and services is important for our future growth and acquisition of new customers and, as a result, we expect our research and development expenses to continue to increase in absolute dollars. However, we expect our research and development expense to fluctuate as a percentage of revenue from period to period depending on the timing of these expenses.

Research and development expense increased by $38.2 million, or 73%, for the year ended December 31, 2022 compared to the same period in 2021, primarily due to ongoing new product related expenses of $14.2 million, an increase in stock-based compensation expense of $13.5 million, higher personnel costs of $13.0 million due to increased headcount, and an increase in depreciation and amortization of lab equipment and licenses of $2.6 million, offset by an increase of non-recurring engineering contra-expense recognized of $6.6 million.

There is no guarantee we will enter into a non-recurring engineering arrangement or recognize such contra-expense in any future period. Based on our current contracts, we expect the non-recurring engineering contra-expense to decline in future periods.

Sales, General and Administrative

Sales, general and administrative expense consists of personnel costs, including stock-based compensation, professional and consulting fees, accounting and audit fees, legal costs, field application engineering support, travel costs, advertising expenses, and allocated overhead costs. We expect sales, general and administrative expense to continue to increase in absolute dollars as we increase our personnel and grow our operations, although it may fluctuate as a percentage of revenue from period to period depending on the timing of these expenses.

Selling, general and administrative expense increased by $22.0 million, or 40%, for the year ended December 31, 2022 compared to the same period in 2021, primarily due to higher stock-based compensation expense of $13.4 million, higher consulting fees of $5.1 million, higher personnel costs of $1.9 million related to increased headcount, and higher advertising spend of $0.8 million.

Interest Income and Other Expense

Interest income and other expense consists primarily of interest expense on our outstanding debt, interest income on our cash balances, and foreign exchange gains and losses. See Note 7 to our consolidated financial statements under Item 8 for more information about our debt.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands except percentage)				
Interest income	$ 7,291	$ —	$ —	$ 7,291	n/a
Other expense	(97)	(488)	(758)	391	(80%)
Total interest income and other expense, net	$ 7,194	$ (488)	$ (758)	$ 7,682	n/a

Interest income and other expense increased $7.7 million for the year ended December 31, 2022 compared to the same period in 2021, primarily related to higher interest income earned on short term investments and net unrealized gain on foreign exchange rates due to increased activities in our foreign subsidiaries and favorable exchange rate fluctuations.

Income Tax Expense

Income tax expense consists primarily of state income taxes and income taxes in certain foreign jurisdictions in which we conduct business. We have a full valuation allowance for deferred tax assets as the realization of the full amount of our deferred tax asset is uncertain, including net operation losses (NOL), carryforwards, and tax credits related primarily to research and development. We expect to maintain this full valuation allowance until realization of the deferred tax assets becomes more likely than not. At December 31, 2022 and 2021, we had federal NOL carry-forwards of approximately $213.3 million and $259.6 million, respectively, state NOL carry-forwards of approximately $65.3 million and $64.5 million, respectively, and foreign NOL carry-forwards of approximately $1.7 million and $2.3 million, respectively. These federal, state, and foreign net operating loss carry-forwards will expire beginning in 2025, 2028, and 2028, respectively. At December 31, 2022 and 2021, we had research and development tax credit carryforwards of approximately $3.9 million and $3.9 million, respectively for U.S. federal income tax purposes and $3.6 million and

$3.6 million, respectively for state income tax purposes. The research and development credit carryforwards for federal tax purposes will begin to expire in 2025, and state tax credits carry forward indefinitely.

	Year Ended December 31,			Change 2022 vs 2021	
	2022	2021	2020	$	%
	(in thousands except percentage)				
Income tax expense	$ (82)	$ (78)	$ (1)	$ (4)	5%

Liquidity and Capital Resources

As of December 31, 2022 and 2021, we had cash and cash equivalents of $34.6 million and $559.5 million, respectively. As of December 31, 2022 we also held $529.5 million of short-term investments in held-to-maturity securities which consisted of treasury bills. Our principal use of cash is to fund our operations and to support growth.

In February 2021, we completed a follow-on public offering, in which we issued and sold 1,500,000 shares of our common stock, resulting in net proceeds to us of $181.6 million after deducting underwriting discounts and commissions and deferred offering costs.

In November 2021, we completed a follow-on public offering, in which we issued and sold 1,300,000 shares of our common stock, resulting in net proceeds to us of $279.0 million after deducting underwriting discounts and commissions and deferred offering costs.

In May 2022, we entered into a Sales Agreement with Stifel, under which we may offer and sell from time to time at our sole discretion, up to an aggregate of 800,000 shares of our common stock, par value $0.0001 per share, through Stifel as our sales agent. The Company intends to use the net proceeds from the shares of common stock offered and sold to primarily replenish funds expended to satisfy anticipated tax withholding and remittance obligations related to the net settlement upon vesting of restricted stock unit awards (“RSU”) granted to employees under the equity incentive plans. During the year ended December 31, 2022, we sold 225,334 shares of our common stock under the Sales Agreement at a weighted average price of $150.78 per share resulting in net proceeds to us of $33.0 million, after deducting underwriting discounts and commissions and deferred offering costs.

Our purchase obligations primarily include design and simulation licenses. For information about our contractual obligations refer to "Note 5 - Lease" and “Note 9 – Commitments and Contingencies” of the Notes to Consolidated Financial Statements.

We expect to continue our investing activities, primarily in the purchase of property and equipment and capitalized software, to support research and development, sales and marketing, product support, and administrative staff.

We believe that our existing cash and cash equivalents and our short-term investments will be sufficient to meet our cash needs for at least the next 12 months. Over the longer term, our future capital requirements will depend on many factors, including our growth rate, the timing and extent of our sales and marketing and research and development expenditures, and the continuing market acceptance of our solutions. In the event that we need to borrow funds or issue additional equity, we cannot provide any assurance that any such additional financing will be available on terms acceptable to us, if at all. If we are unable to raise additional capital when we need it, it would harm our business, results of operations and financial condition.

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

	Year Ended December 31,		
	2022	2021	2020
	(in thousands)		
Net cash provided by operating activities	$ 39,752	$ 59,078	$ 16,604
Net cash used in investing activities	(560,088)	(33,788)	(7,793)
Net cash provided by (used in) financing activities	(4,522)	460,646	1,296
Net increase (decrease) in cash and cash equivalents	$ (524,858)	$ 485,936	$ 10,107

Operating Activities

In 2022, net cash provided by operating activities of $39.8 million was primarily due to net income of $23.3 million and non-cash expenses of $67.5 million, partially offset by a change in operating assets and liabilities of $51.0 million. Non-cash expenses were mainly related to depreciation and amortization, stock-based compensation expense and unrealized interest on held to maturity investments. The changes in operating assets and liabilities resulted in cash provided primarily due to higher accounts receivable due to timing of shipments, an increase in inventories as we managed our inventory levels, higher prepaid expenses and other assets related to advance payments to suppliers for inventory and royalties, higher accrued expenses and other liabilities due to timing of payments, offset by an increase in accounts payable.

In 2021, net cash provided by operating activities of $59.1 million was primarily due to net income of $32.3 million and non-cash expenses of $39.9 million, partially offset by a change in operating assets and liabilities of $13.1 million, non-cash expenses were mainly related to depreciation and amortization and stock-based compensation expense. The changes in operating assets and liabilities resulted in cash provided primarily due to higher accounts receivables due to timing of shipments and an increase in inventories as we managed our inventory levels, partially offset by lower prepaid expenses and other current assets related to advance payments to suppliers for inventory and higher accounts payable and accrued expenses and other liabilities due to timing of payments.

Investing Activities

Our investing activities consist primarily of purchase of short-term investments, capital expenditures for property and equipment purchases. Our capital expenditures for property and equipment have primarily been for general business purposes, including machinery and equipment, leasehold improvements, acquired software, internally developed software used in production and support of our products, computer equipment used internally, and production masks to manufacture our products.

In 2022, cash used in investing activities was $560.1 million. We paid $673.4 million to purchase short-term investments in held-to-maturity securities. We paid $31.8 million largely to purchase test and other manufacturing equipment to support the increase in demand of our products and other property and equipment for general business purposes. We paid $3.9 million to purchase intangible assets in software licenses. All such payments were offset by $149.0 million proceeds from the maturity of held to maturity investments.

In 2021, cash used in investing activities was $33.8 million. We paid $30.9 million largely to purchase test and other manufacturing equipment to support the increase in demand of our products and other property and equipment for general business purposes. We paid $2.9 million to purchase intangible assets.

Financing Activities

Our financing activities have primarily consisted of proceeds from issuance of shares and withholding of taxes on restricted stock units.

During the year ended December 31, 2022, we sold 225,334 shares of our common stock under the Sales Agreement resulting in net proceeds to us of $33.0 million, after deducting underwriting discounts and commissions of $0.7 million and deferred offering costs of $0.2 million. The net proceeds from the Sales Agreement were offset by tax withholdings paid on behalf of employees for net share settlement of $37.6 million.

During the year ended December 31, 2021 we completed follow-on public offerings, in which we issued and sold 2,800,000 shares of common stock resulting in net proceeds of $460.6 million, consisting of proceeds from issuance of shares of $461.3 million net of underwriting commissions and discounts of $21.7 million and deferred offering costs of $0.6 million.

Critical Accounting Estimates

Our consolidated financial statements have been prepared in accordance with GAAP. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, expenses, and related disclosures. We base our estimates on historical experience and on various other assumptions that we believe are reasonable under the circumstances. We evaluate our estimates and assumptions on an ongoing basis. Actual results may differ from these estimates. To the extent that there are material differences between these estimates and our actual results, our future financial statements will be affected.

The critical accounting policies requiring estimates, assumptions, and judgments that we believe have the most significant impact on our consolidated financial statements are described below.

Revenue Recognition

We derive our revenue from product sales to distributors, who in turn sell to original equipment manufacturers or other end customers. We recognize product revenue, at a point in time, upon shipment when we satisfy our performance obligations as evidenced by the transfer of control of our products to customers. We measure revenue based on the amount of consideration we expect to be entitled to in exchange for products. Variable consideration is estimated and reflected as an adjustment to the transaction price. Depending on the terms of the contract, variable consideration is estimated using either the expected value approach or the most likely value approach. We determine variable consideration at the end of each reporting period, which consists primarily of price adjustments and product returns by estimating the amount of consideration we expect to receive from our customers based on historical experience. Our distributors have limited return rights under our contracts with them. If variable considerations are anticipated to exceed historical experience, we may adjust our sales returns allowance accordingly to properly reflect our net revenue. Since our performance obligations relate to contracts with a duration of less than one year, we do not disclose the aggregate amount of the transaction price allocated to performance obligations that are unsatisfied or partially unsatisfied at the end of the reporting period.

Inventories

Inventories consist of raw materials, work-in-process, and finished goods and are stated at the lower of standard cost, determined using first-in first out method or market net realizable value. We review and set standard costs to approximate actual manufacturing costs. We perform detailed reviews of the net realizable value of inventories, both on hand as well as for inventories that we are committed to purchase at the end of each reporting period. We write-down the inventory value for estimated deterioration, excess, obsolete and other factors based on management's assessment of future demand and market conditions of our inventory. These estimates may include uncertain elements such as our demand forecast. These forecasts are developed based on current backlogs, inputs from our customers, and internal analyses which may consist of customer historical purchasing trends and level of inventory in the distributor channel, actual and anticipated design wins, market and economic conditions, technology changes, new product introductions, changes in strategic direction and other factors. If our demand forecast for specific products is greater than actual demand and we fail to reduce manufacturing output accordingly, we could be required to write down additional inventory, which would have a negative impact on our gross margin. Once written-down, inventory write-downs are not reversed until the inventory is sold or scrapped. In the second half of 2022, we acquired inventory in excess of consumption mainly to increase our buffer inventory levels.

Stock-Based Compensation

Stock-based compensation expense is measured at the grant date based on the fair value of the equity award and is recognized as expense over the requisite service period, which is generally the vesting period. We have elected to recognize forfeitures as they occur.

The fair value of each restricted stock unit is estimated based on the market price of our common shares on the date of grant.

We amortize stock-based compensation expense for time-based awards under the straight-line attribution method over the vesting period. Stock-based compensation expense for performance-based awards is recognized when it becomes probable that the performance conditions will be met. We amortize stock-based compensation expense for performance-based awards using the accelerated method. The Company recognizes the expense related to the multi-year performance based restricted stock unit awards on a graded-vesting method over the requisite service period.

Income Taxes

Deferred tax liabilities and assets are recognized for the expected future tax consequences of temporary differences between financial statement carrying amounts and the tax basis of assets and liabilities and net operating loss and tax credit carryforwards. Valuation allowances are established when necessary to reduce deferred tax assets to a level which, more likely than not, will be realized.

A tax position can be recognized only if it is more likely than not to be sustained based solely on its technical merits as of the reporting date and then only in an amount more likely than not to be sustained upon review by the tax authorities. We consider many factors when evaluating and estimating its tax positions and tax benefits, which may require periodic adjustments and which may not accurately anticipate actual outcomes.

Recent Accounting Pronouncements

See Note 2 to our consolidated financial statements under Item 8 for information regarding recently issued accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Foreign Currency Risk

Substantially all of our revenue is denominated in U.S. dollars. Our expenses are generally denominated in the currencies in which our operations are located, which is primarily in the United States and, to a lesser extent, in Malaysia, the Netherlands, France, Taiwan, Japan, Finland, Korea, Germany and Ukraine. Our results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates and may be adversely affected in the future due to changes in foreign exchange rates. The effect of a hypothetical 10% change in foreign currency exchanges rates applicable to our business would not have a material impact on our historical consolidated financial statements. We do not currently have a hedging policy with respect to foreign currency exchange risk.

Interest Rate Risk

We had cash and cash equivalents of $34.6 million and $559.5 million as of December 31, 2022 and 2021, respectively, consisting of bank deposits, money market funds, and treasury bills. We also had short-term investments in held-to-maturity securities of $529.5 million consisting of treasury bills as of December 31, 2022. Such interest-earning instruments carry a degree of interest rate risk. During the year ended December 31, 2022 we generated $7.3 million in interest income due to higher cash, cash equivalents and short-term investment balances, and rising interest rates.

We do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate risk exposure. The effect of a hypothetical 10% change in interest rates applicable to our business would not have a material impact on our historical consolidated financial statements.

Item 8. Financial Statements and Supplementary Data.

Index to Consolidated Financial Statements and Financial Statement Schedule

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors

SiTime Corporation

Santa Clara, California

Opinion on the Consolidated Financial Statements

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

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits included performing procedures to assess the risks of material misstatement of the 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. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

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

Valuation of Inventory

As described in Note 1 to the consolidated financial statements, the Company’s consolidated inventory balance is stated at lower of cost or net realizable value. The valuation of inventory is adjusted by the Company when conditions indicate a decline in value due to obsolescence and is based on estimates for inventory levels in excess of management’s forecasted demand. Forecasting customer demand can be challenging as certain judgments are required to determine if and how changing market conditions will impact future demand.

We identified the valuation of inventory as a critical audit matter due to certain judgments required by Management related to forecasting future demand for excess units on hand based on the Company’s historical sales and market conditions. Auditing these judgments involved especially subjective auditor judgment due to the nature and extent of audit effort required to address these matters.

The primary procedures we performed to address this critical audit matter included:

- Evaluating the appropriateness of management’s inventory valuation methodology, including qualitative and quantitative factors, designed to identify excess units on hand based on ending inventory quantities compared to forecasted shipment quantities.

- Evaluating the reasonableness of management's judgments related to forecasted customer demand by (i) performing retrospective review of the Company’s prior year estimates to actual results, and (ii) evaluating the reasonableness of sales forecasts by comparing to current backlog and historical sales data.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2019.

San Jose, California

February 27, 2023

SiTime Corporation

Consolidated Balance Sheets
(In thousands, except per share amounts)

	As of December 31, 2022	As of December 31, 2021
Assets:		
Current assets:		
Cash and cash equivalents	$ 34,603	$ 559,461
Short-term investments in held-to-maturity securities	529,494	—
Accounts receivable, net	41,229	38,376
Inventories	57,650	23,630
Prepaid expenses and other current assets	6,091	4,476
Total current assets	669,067	625,943
Property and equipment, net	58,772	37,902
Intangible assets, net	5,205	5,977
Right-of-use assets, net	10,848	8,194
Other assets	6,724	193
Total assets	$ 750,616	$ 678,209
Liabilities and Stockholders' Equity:		
Current liabilities:		
Accounts payable	$ 14,881	$ 13,103
Accrued expenses and other current liabilities	18,913	24,282
Total current liabilities	33,794	37,385
Lease liabilities	8,149	6,398
Other non-current liabilities	193	1,929
Total liabilities	42,136	45,712
Commitments and contingencies (Note 6)		
Stockholders’ equity:		
Common stock, $0.0001 par value - 200,000 shares authorized; 21,702 and 20,825 shares issued and outstanding at December 31, 2022 and 2021	2	2
Additional paid-in capital	716,343	663,614
Accumulated deficit	(7,865)	(31,119)
Total stockholders’ equity	708,480	632,497
Total liabilities and stockholders’ equity	$ 750,616	$ 678,209

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

SiTime Corporation

Consolidated Statements of Operations and Comprehensive Income (Loss)
(In thousands, except per share amounts)

	Year Ended December 31, 2022	2021	2020
Revenue	$ 283,605	$ 218,808	$ 116,156
Cost of revenue	100,643	79,346	58,224
Gross profit	182,962	139,462	57,932
Operating expenses:			
Research and development	90,288	52,104	31,652
Selling, general and administrative	76,532	54,515	34,893
Total operating expenses	166,820	106,619	66,545
Income (loss) from operations	16,142	32,843	(8,613)
Interest income	7,291	—	—
Other expense	(97)	(488)	(758)
Income (loss) before income taxes	23,336	32,355	(9,371)
Income tax expense	(82)	(78)	(1)
Net income (loss)	$ 23,254	$ 32,277	$ (9,372)
Net income (loss) attributable to common stockholders and comprehensive income (loss)	$ 23,254	$ 32,277	$ (9,372)
Net income (loss) per share attributable to common stockholders, basic	$ 1.09	$ 1.70	$ (0.58)
Net income (loss) per share attributable to common stockholders, diluted	$ 1.03	$ 1.53	$ (0.58)
Weighted-average shares used to compute basic net income (loss) per share	21,245	19,006	16,064
Weighted-average shares used to compute diluted net income (loss) per share	22,664	21,144	16,064

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

SiTime Corporation

Consolidated Statements of Stockholders' Equity
(In thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount			
Balances at December 31, 2019	14,968	$ 2	$ 116,162	$ (54,024)	$ 62,140
Stock-based compensation expense	—	—	14,816	—	14,816
Net loss	—	—	—	(9,372)	(9,372)
Issuance of common stock upon follow-on public offering net of underwriting discounts and commissions and other offering costs	1,525	—	45,789	—	45,789
Issuance of shares upon vesting of restricted stock units, net of tax withholdings	657	—	(3,493)	—	(3,493)
Balances at December 31, 2020	17,150	2	173,274	(63,396)	109,880
Stock-based compensation expense	—	—	29,694	—	29,694
Net income	—	—	—	32,277	32,277
Issuance of common stock upon follow-on public offerings net of underwriting discounts and commissions and other offering costs	2,800	—	460,646	—	460,646
Issuance of shares upon vesting of restricted stock units	875	—	—	—	—
Balances at December 31, 2021	20,825	2	663,614	(31,119)	632,497
Stock-based compensation expense	—	—	57,251	—	57,251
Net income	—	—	—	23,254	23,254
Issuance of common stock in connection with At-The-Market offering net of underwriting discounts and commissions and other offering costs	225	—	33,030	—	33,030
Issuance of shares upon vesting of restricted stock units, net of tax withholdings	652	—	(37,552)	—	(37,552)
Balances at December 31, 2022	21,702	$ 2	$ 716,343	$ (7,865)	$ 708,480

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

SiTime Corporation

Consolidated Statements of Cash Flows
(In thousands)

	Year Ended December 31,		
	2022	**2021**	**2020**
Cash flows from operating activities:			
Net income (loss)	$ 23,254	$ 32,277	$ (9,372)
Adjustments to reconcile net income to net cash provided by operating activities			
Depreciation and amortization expense	11,843	7,926	6,402
Stock-based compensation expense	57,415	29,992	16,009
Inventory write-down	2,972	1,817	1,446
Impairment of internal-use software	—	—	959
Unrealized interest on held to maturity securities	(5,055)	—	—
Other	358	117	106
Changes in assets and liabilities:			
Accounts receivable, net	(2,853)	(14,456)	(6,261)
Related party accounts receivable	—	736	337
Inventories	(36,992)	(13,096)	(2,070)
Prepaid expenses and other assets	(7,460)	(1,859)	2,951
Accounts payable	2,468	5,826	2,606
Accrued expenses and other liabilities	(6,198)	9,798	3,491
Net cash provided by operating activities	39,752	59,078	16,604
Cash flows from investing activities			
Purchase of held to maturity securities	(673,370)	—	—
Proceeds from maturity of held to maturity securities	148,931	—	—
Purchase of property and equipment	(31,793)	(30,878)	(6,098)
Cash paid for intangibles	(3,856)	(2,910)	(1,695)
Net cash used in investing activities	(560,088)	(33,788)	(7,793)
Cash flows from financing activities			
Tax withholding paid on behalf of employees for net share settlement	(37,552)	—	(3,493)
Proceeds from public offering	33,977	461,264	48,800
Payments for offering costs	(947)	(618)	(3,011)
Proceeds from loans from financial institutions	—	—	35,000
Principal payments on loans to financial institutions	—	—	(76,000)
Net cash provided by (used in) financing activities	(4,522)	460,646	1,296
Net increase (decrease) in cash and cash equivalents	(524,858)	485,936	10,107
Cash and cash equivalents			
Beginning of period	559,461	73,525	63,418
End of period	$ 34,603	$ 559,461	$ 73,525
Supplemental disclosure of cash flow information			
Interest paid during the period	—	—	799
Income taxes paid	58	24	1
Supplemental disclosure of noncash flow information			
Unpaid property and equipment	747	1,437	343
Unpaid intangibles, net	606	3,178	—
Right-of-use assets acquired under operating leases	4,761	689	382

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

SiTime Corporation

Notes to Consolidated Financial Statements

1. The Company and Summary of Significant Accounting Policies

SiTime Corporation (the "Company") was incorporated in the State of Delaware in December 2003. The Company is a leading provider of precision timing solutions to the global electronics industry, providing the timing functionality that is needed for electronics to operate reliably and correctly. The Company's products have been designed to address a wide range of applications across a broad array of end markets. The Company operates a fabless business model and leverages its global network of distributors to address the broad set of end markets that it serves.

Outbreak of Coronavirus Disease 2019 ("the COVID-19 pandemic")

The COVID-19 pandemic continued to impact the Company's workforce and the operations of its customers and suppliers during 2022. In response to the COVID-19 pandemic and related government measures, the Company implemented safety measures to protect its employees and contractors at its locations around the world.

The effects of the ongoing COVID-19 pandemic on our business are evolving and difficult to predict. The ultimate impact of the COVID-19 pandemic on our business, results of operations, and financial condition continues to depend on future developments which are not within our control and cannot be accurately predicted and are uncertain, including the duration, scope and severity of the pandemic, any additional resurgences, variants and the severity of variants, and the ability to effectively and widely manufacture and distribute vaccines.

Reporting Calendar

The Company's fiscal year begins on January 1 of the year stated and ends on December 31 of the same year. The Company reports its results on a calendar year basis.

Principles of Consolidation

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. The significant areas requiring the use of management estimates and assumptions include revenue recognition, non-recurring engineering services, estimate of reserve for excess and obsolete inventories, sales reserves, internally developed software capitalization, and valuation allowances for deferred tax assets. Actual results may differ materially from such estimates. Management believes that the estimates, and judgments upon which they rely, are reasonable based upon information available to them at the time that these estimates and judgments are made. To the extent that there are material differences between these estimates and actual results, the Company's consolidated financial statements will be affected.

Foreign Currency Remeasurement

The Company and its wholly-owned subsidiaries use the U.S. dollar as the functional currency. Foreign currency assets and liabilities are remeasured into U.S. dollars at the end-of-period exchange rates except for non-monetary assets and liabilities, which are measured at historical exchange rates. Revenue and expenses are remeasured using an average exchange rate in effect for the period, except for items related to non-monetary assets and liabilities, which are measured at historical exchange rates. Gains or losses from foreign currency remeasurement and transactions are included in other expense, net. For the years ended December 31, 2022, 2021, and 2020, foreign currency remeasurement and transactions gains and losses resulting in a net charge of $0.1 million, $0.5 million, and $0.1 million, respectively.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash balances in the Company's bank checking and savings accounts and liquid short-term investments with original or remaining maturities of 90 days or less at the date of purchase, readily convertible to known amounts of cash.

Fair Value Measurements

The carrying amounts of the Company's financial instruments, which include cash equivalents, accounts receivable, accounts payable, accrued liabilities, and other current liabilities, approximate their fair values due to their short maturities. The Company determines fair value measurements used in its consolidated financial statements based upon the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value hierarchy distinguishes between (i) market participant assumptions developed based on market data obtained from independent sources (observable inputs), and (ii) an entity's own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs).

The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy are described below:

Level 1: Valuations based on quoted prices in active markets for identical assets or liabilities that the entity has the ability to access.

Level 2: Valuations based on quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable data for substantially the full term of the assets or liabilities.

Level 3: Valuations based on inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

Cash and cash equivalents

At December 31, 2022 and 2021, cash balances in bank checking and savings accounts of $31.6 million and $339.3 million, were valued using Level 1 of the fair value hierarchy. At December 31, 2022 and 2021, highly liquid money market funds of $3.0 million and $220.2 million, respectively, were valued using Level 1, of the fair value hierarchy, quoted prices in active markets for identical assets and are included in cash equivalents.

Short-term investments in held-to-maturity securities

As of December 31, 2022, the Company had entered into treasury bills with maturities ranging from 3 to 6 months, which the Company intends to hold until maturity and has classified as held-to-maturity securities. The held-to-maturity securities are recorded at amortized cost totaling $524.4 million with gross unrealized gains of $5.1 million and net carrying value of $529.5 million. The carrying value of our investments is reviewed quarterly for changes in circumstances or the occurrence of events that suggests an investment may not be fully recoverable. These treasury bills were valued using Level 1 of the fair value hierarchy, quoted prices in active markets for identical assets, and are included in short-term investments.

There were no transfers between Level 1 and Level 2 categories during any of the periods presented.

Accounts Receivable and Allowances for Credit Losses

Accounts receivable are stated at amounts estimated by management to be net realizable value. An allowance for credit losses is recorded when it is probable that amounts will not be collected based on historical collection trends, age of outstanding receivables, specific customer circumstances, existing economic conditions and future forecasted information. The Company performs periodic credit evaluations of its customers' financial condition and generally requires no collateral from its customers. Losses have not been significant in any of the periods presented.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist principally of cash and cash equivalents, short-term investments and accounts receivable. The Company's cash and cash equivalents amount is subject to concentration of credit risk. Substantially all of the Company's cash and cash equivalents balances are in excess of Federal Deposit Insurance Corporation insurance limits with financial institutions.

The Company extends credit based on an evaluation of the customer's financial condition and collateral is not typically required. The Company primarily sells its products through third-party distributors. For the years ended December 31, 2022, 2021, and 2020, three distributors directly accounted for 10% or more of the Company's revenue.

The following table discloses these customers' percentage of revenue for the respective periods:

	Year Ended December 31,		
	2022	2021	2020
Customer			
Pernas Electronics Co. Ltd.	20%	24%	26%
Arrow Electronics, Inc.	17%	14%	15%
Quantek Technology Corporation	12%	10%	18%

Revenue from sales to one end customer through multiple distributors accounted for 20%, 22% and 40% of consolidated revenues for the years ended December 31, 2022, 2021, and 2020, respectively. No other distributors or end customers accounted for 10% or more of the Company's consolidated revenues for the years ended December 31, 2022, 2021, and 2020.

At December 31, 2022 and 2021 these customers accounted for 10% or more of accounts receivable:

	As of December 31,	
	2022	2021
Customer		
Pernas Electronics Co. Ltd.	24%	16%
Quantek Technology Corporation	17%	13%
Arrow Electronics, Inc.	15%	14%
Smith & Associates	0%	11%

Inventories

Inventories are stated at the lower of standard cost (which approximates actual cost on a first-in, first-out basis) or net realizable value. The Company, at least quarterly, assesses the recoverability of all inventories to determine whether adjustments are required to record inventory at the lower of cost or net realizable value. The Company reduces the value of inventory by establishing excess and obsolete inventories reserves based on management's assessment of future demand and market conditions. Actual demand may differ from forecasted demand and such differences may have a material effect on recorded value of inventory. Inventory reserve write-downs, once established, are not released until the related inventory has been sold or scrapped. Rebates from the Company's foundries are recorded as a reduction of inventory cost and are recognized in cost of revenue over the inventory turnover days of the Company. Most of the Company's inventory is warehoused at its contract manufacturers.

Property and Equipment

Property and equipment are recorded at cost, less accumulated depreciation. Depreciation of property and equipment is recognized on a straight-line basis over the estimated useful lives of the respective assets as follows:

Lab and manufacturing equipment	3 to 7 years
Computer equipment	3 years
Furniture and fixtures	5 years
Leasehold improvements	Shorter of remaining lease term or estimated useful lives of the assets

The Company capitalizes the costs of purchased mask sets that are utilized during the photolithography phase of manufacturing our products, when technological feasibility and marketability have been established. The capitalization occurs upon the completion of a detailed design, the absence of significant development uncertainties and the determination of market acceptance. Such amounts are included in property and equipment in the consolidated balance sheets and are amortized to cost of revenue over their estimated useful life of 5 to 7 years. However, if significant uncertainties exist regarding the future utility of a particular mask set, then its related costs are expensed to research and development at the time the significant uncertainties are identified.

Maintenance and repair costs are charged to expense as incurred, and expenditures that extend the useful lives of assets are capitalized. Upon retirement or sale of the property and equipment, the cost and related accumulated depreciation are removed from the balance sheet and the resulting gain or loss is recorded in operating expenses.

Intangible Assets

Intangible assets include the costs related to acquired software as well as costs related to software internally developed, or modified solely to meet the Company's internal requirements, with no substantive plans to market such software at the time of development. The Company develops proprietary design automation software for its MEMS-based resonators. Costs incurred during the preliminary planning and evaluation stage of the project and during post implementation operational stage are expensed as incurred. Costs incurred during the application development stage of the software are capitalized. The Company defines the configuration and coding process as the application development stage. Capitalized internal use software costs are amortized, on a straight-line basis under cost of revenue over the estimated useful life of approximately 2 to 3 years. Purchased intangibles with finite lives are amortized using the straight-line method over the estimated economic lives of the assets of 3 to 5 years.

Leases

The Company applies the guidance in Accounting Standards Codification (“ASC”), Topic 842 to individual leases of assets. The Company recognizes a transaction as a lease when it receives substantially all of the economic benefits from and directs the use of specified property, plant and equipment.

Operating leases are included in right-of-use (“ROU”), assets, accrued expenses and other current liabilities, and lease liabilities in the Company’s consolidated balance sheets. ROU assets represent the Company’s right to use an underlying asset for the lease term and lease liabilities represent the present value of the Company’s obligation to make lease payments arising from the lease. The Company currently does not have any finance leases.

The Company has elected the practical expedient within ASC Topic 842 to not separate lease and non-lease components within lease transactions for all classes of assets. Additionally, the Company has elected the short-term lease exception for all classes of assets and does not apply the recognition requirements for leases of 12 months or less and recognizes lease payments for short-term leases as expense either straight-line over the lease term or as incurred depending on whether the lease payments are fixed or variable. These elections are applied consistently for all leases.

When discount rates implicit in leases cannot be readily determined, the Company uses the applicable incremental borrowing rate at lease commencement to perform lease classification tests on lease components and to measure ROU assets and lease liabilities. The incremental borrowing rate used by the Company was based on the rate of interest that the Company would have to pay to borrow on a collateralized basis over a similar term, an amount equal to the lease payments in a similar economic environment.

Impairment of Long-Lived Assets

The Company evaluates its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the estimated fair value of the assets.

The Company determined that no events or changes in circumstances indicate that impairment of its long-lived assets has occurred.

Warranty

The Company provides limited lifetime warranty coverage on all of its products by guaranteeing that all timing components from the Company will be free from defects in workmanship and materials and will conform to specifications for the life of the system. This assurance-type warranty is not considered a separate performance obligation, and thus no transaction price is allocated to it. The Company records the warranty costs in cost of revenue in the consolidated statements of operations and comprehensive income (loss). The warranty reserve is calculated using historical claim information to project future warranty claims activity and is recorded within accrued expenses and other current liabilities and other non-current liabilities on the consolidated balance sheets based on the expected timing of the related payments. To date, the Company has had negligible returns of any defective products, and hence the warranty reserve balances as of December 31, 2022 and 2021 were less than $0.1 million.

Income Taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the carrying amounts in the consolidated financial statements of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards, using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in earnings in the period that includes the enactment date. A valuation allowance is provided in order to reduce the deferred tax assets to a level which, more likely than not, will be realized.

The Tax Cuts and Jobs Act of 2017 (the "Tax Act") and The Coronavirus Aid, Relief, and Economic Security ("CARES Act") , make broad and complex changes to the U.S. tax code. These computations require significant judgments and estimates to be made regarding the interpretation of the provisions within the Tax Act along with the preparation and analysis of information not previously required.

While the Company believes it has adequately reserved for its uncertain tax positions, no assurance can be given that the final tax outcome of these matters will not be different. The Company adjusts these reserves in light of changing facts and circumstances, such as the closing of a tax audit. 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 and the effective tax rate in the period in which such determination is made.

The Company recognizes tax positions in the consolidated financial statements only when it is more likely than not that the position will be sustained upon examination by the relevant taxing authority. Liabilities are established for differences between positions taken in a tax return and amounts recognized in the consolidated financial statements. The Company reports interest and penalties related to uncertain tax positions, if any, in the provision for income taxes in the consolidated statements of operations and comprehensive income (loss). To the extent that accrued interest and penalties do not ultimately become payable, amounts accrued will be reduced and reflected as a reduction of the overall provision for income taxes in the period that such determination is made.

Revenue Recognition

The Company derives revenue from its product sales to distributors, who in turn sell to original equipment manufacturers or other end customers. The Company recognizes product revenue, at a point in time, upon shipment when it satisfies its performance obligations as evidenced by the transfer of control of its products to customers. The Company measures revenue based on the amount of consideration it expects to be entitled to in exchange for products. Variable consideration is estimated and reflected as an adjustment to the transaction price. Depending on the terms of the contract, variable consideration is estimated using either the expected value approach or the most likely value approach. The Company determines variable consideration, which consists primarily of price adjustments and product returns by estimating the amount of consideration the Company expects to receive from its customers based on historical experience of price adjustments and product returns. Initial estimates of price adjustments and product returns are updated at the end of each reporting period if additional information becomes available. Changes to the Company's estimated variable consideration were not material for the periods presented. Since the Company's performance obligations relate to contracts with a duration of less than one year, it does not disclose the aggregate amount of the transaction price allocated to performance obligations that are unsatisfied or partially unsatisfied at the end of the reporting period.

The Company's payment terms vary by contract type and type of customer and generally range from 30 to 60 days from shipment. The Company has also elected to recognize the cost for freight and shipping when control over the products sold passes to customers and revenue is recognized.

As a practical expedient, the Company records the incremental costs of obtaining a contract, consisting primarily of sales commissions, when incurred because the amortization period is one year or less. These costs are recorded within sales and marketing expenses. The Company had a distribution agreement with MegaChips, whereby the Company appointed MegaChips as the exclusive distributor of its products in Japan. The Company recognized revenue upon shipment derived from sales of products through MegaChips in the amount of expected payments from parties which purchased the products as adjusted for estimated price concessions and product returns. In connection with the Company's efforts to contract directly with distributors in Japan, the Company and MegaChips mutually terminated the Distribution Agreement effective November 3, 2021.

Cost of Revenue

Cost of revenue consists of wafers acquired from third-party foundries, assembly, packaging, and test cost of the Company’s products paid to third-party contract manufacturers, and personnel and other costs associated with the manufacturing operations of the Company. Cost of revenue also includes depreciation of production equipment, inventory write-downs, amortization of internally developed software, shipping and handling costs, and allocation of overhead and facility costs. The Company also includes credits for rebates received from foundries in cost of revenue.

Research and Development Expenses

Research and development costs consist primarily of personnel cost, material cost, and facilities related expenses, incurred in the course of planned research and development of new products. Research and development costs are expensed as incurred.

Non-recurring engineering services

The Company has certain contracts to provide non-recurring engineering (NRE) services for research and development arrangements through 2023, which do not meet the requirement to be accounted for under ASC 606, Revenue from Contracts with Customers. The Company recognizes the payments received under these NRE arrangements as liabilities and recognizes them as an offset to research and development expense as the company achieve the milestones of the contract. As the progress towards completion occurs, the Company uses an input method based on the ratio of costs incurred to date to total estimated costs of the project. Significant judgment is required to estimate the remaining effort to complete the project. These estimates are reassessed throughout the term of the arrangement. A liability of $2.7 million and $0.2 million was recorded as accrued expenses and other current liabilities, and other non-current liabilities, respectively, in the consolidated balance sheet as of December 31, 2022. A liability of $5.7 million and $0.5 million was recorded as accrued expenses and other current liabilities, and other non-current liabilities, respectively, in the consolidated balance sheet as of December 31, 2021. For the years ended December 31, 2022 and 2021, the Company recorded $9.0 million and $2.4 million, respectively as a reduction of research and development expenses in the consolidated statement of operations. There was no reduction of research and development expense recorded during the year ended December 31, 2020.

Selling, General and Administrative Expenses

Selling, general and administrative expenses primarily consist of personnel costs, field application engineering support, travel costs, professional and consulting fees, accounting and audit fees, legal, advertising expenses, and allocated overhead costs. Selling, general and administrative costs are expensed as incurred. Advertising expenses were $2.3 million, $1.5 million and $0.3 million, for the years ended December 31, 2022, 2021, and 2020, respectively.

Stock-Based Compensation

The Company grants restricted stock units (“RSUs”) of its own common stock and such grants are valued at the fair market value of the Company’s stock on the date of the grant and recognizes the compensation expense using the straight-line method over the requisite service period.

The Company amortizes stock-based compensation expense for time-based awards under the straight-line attribution method over the vesting period. Stock-based compensation expense for performance-based awards is recognized when it becomes probable that the performance conditions will be met. The Company amortizes stock-based compensation expense for performance-based awards using the accelerated method. The Company recognizes the expense related to the multi-year performance based restricted stock unit awards ("MYPSU") on a graded-vesting method over the requisite service period.

The Company recognizes forfeitures as they occur.

Net Income (Loss) Per Share Attributable to Common Stockholders

Basic net income (loss) per share attributable to common stockholders is calculated by dividing the net income (loss) attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period, without consideration for potentially dilutive securities. Diluted net income (loss) per share is computed by dividing the net income (loss) attributable to common stockholders by the weighted-average number of shares of common stock and potentially dilutive securities outstanding for the period. Refer to "Note 3 - Net Income (Loss) Per Share" for further discussion regarding potentially dilutive and anti-dilutive securities.

Comprehensive Income (Loss)

The Company has no components of other comprehensive income loss. Therefore, net income (loss) equals comprehensive income (loss) for all periods presented.

2. Recent Accounting Pronouncements

Recently Adopted Accounting Guidance

There are no new accounting pronouncements that are pending to be adopted by the Company.

3. Net Income (Loss) Per Share

The following table summarizes the computation of basic and diluted net income (loss) per share attributable to common stockholders of the Company:

	Year Ended December 31,		
	2022	2021	2020
	(in thousands, except per share data)		
Net income (loss) attributable to common stockholders	$ 23,254	$ 32,277	$ (9,372)
Weighted-average shares outstanding			
Weighted average shares used to compute basic net income per share	21,245	19,006	16,064
Dilutive effect of employee equity incentive plans	1,419	2,138	—
Weighted average shares used to compute diluted net income (loss) per share	22,664	21,144	16,064
Net income (loss) attributable to common stockholders per share, basic	$ 1.09	$ 1.70	$ (0.58)
Net income (loss) attributable to common stockholders per share, diluted	$ 1.03	$ 1.53	$ (0.58)

Potential dilutive securities include dilutive common shares from share-based awards attributable to the assumed exercise of vested restricted stock units using the treasury stock method. Under the treasury stock method, potential common shares outstanding are not included in the computation of diluted net income per share if their effect is anti-dilutive.

Anti-dilutive potential shares from share-based awards are excluded from the calculation of diluted earnings per share if either their exercise price exceeded the average market price during the period or the share-based awards were determined to be anti-dilutive based on applying the treasury stock method. During the year ended December 31, 2022, 2021, and 2020 the Company had 309,963, 3,955, and 2,095,135 potential shares from share-based awards that are anti-dilutive, respectively. Anti-dilutive potential shares from share-based awards are excluded from the calculation of diluted loss per share for the year ended December 31, 2020 due to the net losses reported in these periods.

4. Balance Sheets Components

Accounts Receivable, net

Accounts receivable, net consisted of the following:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Accounts receivable, gross	$ 41,279	$ 38,426
Allowance for credit losses	(50)	(50)
Accounts receivable, net	$ 41,229	$ 38,376

Inventory

Inventory consisted of the following:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Raw materials	$ 17,518	$ 1,841
Work in progress	33,687	16,963
Finished goods	6,445	4,826
Total inventories	$ 57,650	$ 23,630

Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consisted of the following:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Prepaid expenses	$ 3,118	$ 2,398
Other current assets	2,973	2,078
Total prepaid expenses and other current assets	$ 6,091	$ 4,476

Property and Equipment, Net

Property and equipment, net consisted of the following:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Lab and manufacturing equipment	$ 73,220	$ 44,283
Computer equipment	3,170	1,977
Furniture and fixtures	509	433
Construction in progress	5,967	7,100
Leasehold improvements	7,129	5,211
	89,995	59,004
Accumulated depreciation	(31,223)	(21,102)
Total property and equipment, net	$ 58,772	$ 37,902

Depreciation expense related to property and equipment was $10.1 million, $5.7 million, and $3.7 million for the years ended December 31, 2022, 2021, and 2020, respectively.

Intangible Assets, Net

Intangible assets, net consisted of the following:

	As of					
	December 31, 2022			December 31, 2021		
	(in thousands)					
	Gross Assets	Accumulated Amortization	Net Assets	Gross Assets	Accumulated Amortization	Net Assets
Internal use software	$ 9,434	$ (8,833)	$ 601	$ 9,434	$ (8,633)	$ 801
Purchased software	12,583	(7,978)	4,604	11,703	(6,527)	5,176
Intangible assets	$ 22,017	$ (16,811)	$ 5,205	$ 21,137	$ (15,160)	$ 5,977

Amortization expense for intangible assets was $1.7 million, $2.2 million, and $2.7 million, for the years ended December 31, 2022, 2021, and 2020, respectively. During the years ended December 31, 2022 and 2021, the Company purchased and capitalized software costs of $3.9 million and $6.0 million, respectively, to support research and development efforts. During the year ended December 31, 2020, the Company recorded impairment charges of $1.0 million related to capitalized cost of software that was within the development phase and was being developed solely to meet the Company's internal needs. The impairment charge was recorded as research and development expense in the consolidated statement of operations.

As of December 31, 2021, the Company had $0.8 million of intangibles that were still in development stage and were not being amortized. In July 2022, the Company placed the related product into production and began amortizing the internal use software. As of December 31, 2022, there were no intangibles that were in development stage and not being amortized. The estimated aggregate future amortization expense for intangible assets and subject to amortization as of December 31, 2022 is summarized as below:

	(in thousands)
2023	$ 2,366
2024	1,671
2025	668
2026	354
2027 and beyond	146
	$ 5,205

Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities consisted of the following:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Accrued payroll and related benefits	$ 6,109	$ 7,237
Revenue reserves	1,840	2,194
Deferred non-recurring engineering services	2,689	5,666
Short term lease liability	2,485	1,336
Accrued customer rebates	234	3,107
Other accrued expenses	5,556	4,742
Total accrued expenses and other current liabilities	$ 18,913	$ 24,282

As of December 31, 2021 and through June 30, 2022, the Company had recorded $2.7 million of accrued customer rebates as contra revenue under a customer agreement. In July 2022, the customer waived the right to the rebate and the Company recorded the $2.7 million of accrued customer rebate as revenue.

5. Leases

The Company leases real estate property under operating leases. The Company leases office space in California, Michigan, Malaysia, Japan, Taiwan, the Netherlands, Finland, and Ukraine all under non-cancellable operating leases with various expiration dates through April 2027.

In January 2021, the Company signed an amendment to its Santa Clara office space lease where the lessor provided the Company lease incentives of $0.4 million and extended the term of the lease by three months. The amendment was accounted as a single modified lease and the remaining payments were remeasured using an updated discount rate. The agreement provides for an option to renew for an additional 5 years and for monthly rent payments through the term of the lease. During the year ended December 31, 2022, the Company commenced 8 operating leases with 2 to 7 year lease terms, and recorded right-of-use assets of $5.1 million, current lease liabilities of $1.1 million, and long-term lease liabilities of $4.2 million upon the commencement of these leases.

The remaining lease terms vary from 1 to 6 years. For its leases the Company has options to extend the lease term for periods varying from 1 to 5 years. These renewal options are not considered in the remaining lease term unless it is reasonably certain that the Company will exercise such options. The Company also has variable lease payments that are primarily composed of common area maintenance and utility charges.

The table below presents the lease-related assets and liabilities recorded on the consolidated balance sheet as of December 31, 2022 and 2021:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
Right-of-use assets	$ 10,848	$ 8,194
Lease liabilities included in accrued expenses and other current liabilities	2,485	1,336
Lease liabilities - non-current	8,149	6,398
Total operating lease liabilities	$ 10,634	$ 7,734
Weighted-average remaining lease term (years)	4.0	5.0
Weighted-average discount rate	4.6%	4.5%

The table below presents certain information related to the lease costs for operating leases for the years ended December 31, 2022, 2021, and 2020:

	Year Ended December 31,		
	2022	2021	2020
		(in thousands)	
Operating lease cost	$ 2,759	$ 1,761	$ 1,696
Short-term lease cost	1,389	579	356
Variable lease cost	911	599	332
Total lease cost	$ 5,059	$ 2,939	$ 2,384

Cash paid for operating lease liabilities was $2.5 million, $1.7 million, and $2.3 million for the years ended December 31, 2022, 2021, and 2020 respectively.

Operating Lease Cash Flows

The table below reconciles the undiscounted cash flows for each of the first five years and total of the remaining years to the operating lease liabilities recorded on the consolidated balance sheet as of December 31, 2022:

	(in thousands)
2023	$ 2,922
2024	3,056
2025	2,696
2026	2,171
2027	628
2028 and beyond	190
Total minimum lease payments	11,663
Less: amount of lease payments representing interest	(1,029)
Present value of future minimum lease payments	10,634
Less: current obligations under leases	(2,485)
Long-term lease liabilities	$ 8,149

6. Commitments and Contingencies

Purchase Commitments

The Company purchases components from a variety of suppliers and uses several contract manufacturers to provide manufacturing services for its products. During the normal course of business, in order to manage manufacturing lead times and to help ensure adequate component supply, the Company enters into agreements with the Company's contract manufacturers and suppliers that allow them to procure inventory based upon criteria as defined by the Company. In addition, the Company has a multi-year agreement to purchase minimum quantities of MEMS wafers and is responsible for research and development, tooling, and samples cost under the agreement. A portion of the Company's reported purchase commitments arising from these agreements consists of firm, non-cancelable purchase commitments. In certain instances, these agreements allow the Company the option to cancel, reschedule, and adjust the Company's requirements based on its business needs prior to when production starts. However, in situations where the Company is unable to cancel, reschedule, or adjust the purchase commitment due to changing customer demand, excess inventories could result in material inventory provisions. Total future non-cancelable purchase commitments as of December 31, 2022 were as follows:

	(in thousands)
2023	$ 16,421
2024	10,039
2025	7,162
2026	5,162
2027	—
2028 and beyond	—
Total	$ 38,784

Indemnification

The Company is a party to a variety of agreements pursuant to which it may be obligated to indemnify other parties to such agreements with respect to certain matters. Typically, these obligations arise in the context of contracts that the Company has entered into, under which the Company customarily agrees to hold the other party harmless against losses arising from a breach of representations and covenants or terms and conditions related to such matters as the sale and/or delivery of its products, title to assets sold, certain intellectual property claims, defective products, specified environmental matters, and certain income taxes. Further, the Company's obligations under these agreements may be limited in terms of time, amount, or the scope of its responsibility and in some instances, the Company may have recourse against third parties for certain payments made under these agreements. It is not possible to predict the maximum potential amount of future payments under these agreements due to the conditional nature of the Company's obligations and the unique facts and circumstances involved in each particular agreement. Historically, the Company has had no material indemnification claims under these agreements.

Legal Matters

From time to time, the Company may be a party to various litigation claims in the normal course of business. Legal fees and other costs associated with such actions are expensed as incurred. The Company assesses, in conjunction with legal counsel, the need to record a liability for litigation and contingencies. Accrual estimates are recorded when and if it is determined that such a liability for litigation and contingencies are both probable and reasonably estimable.

7. Debt Obligations

On August 31, 2015, the Company entered into a bank transaction agreement with The Bank of Tokyo Mitsubishi UFJ, Ltd. ("MUFG"). The agreement provided for a revolving line of credit with a maximum available borrowing of $20.0 million, which was increased to $50.0 million in June 2018. Between August 2015 and December 31, 2019, the Company borrowed $139.0 million in several draw-downs against the revolving line of credit with terms ranging from one month to one year and interest rate ranging between 1.01% to 4.07%. On July 24, 2020, the Company paid $76.0 million to fully pay down all outstanding loans and cancel the line of credit with MUFG of which $12.0 million of loans were prepaid with a penalty of $0.1 million.

8. Stockholders' Equity

The Company's certificate of incorporation, as amended and currently in effect, authorizes the Company to issue 200,000,000 shares of common stock, par value $0.0001 per share. Each share of common stock is entitled to one vote. The holders of common stock are also entitled to receive dividends whenever funds are legally available and when and if declared by the board of directors, subject to the prior rights of holders of all classes of preferred stock outstanding. The Company has never declared any dividends.

Follow-on Public Offerings

On June 16, 2020, the Company completed a follow-on public offering, in which it issued and sold 1,525,000 shares of its common stock, resulting in net proceeds to the Company of $45.8 million after deducting underwriting discounts and commissions of $2.7 million and deferred offering costs of $0.3 million.

On February 22, 2021, the Company completed an additional follow-on public offering, in which we issued and sold 1,500,000 shares of its common stock, resulting in net proceeds to the Company of $181.6 million after deducting underwriting discounts and commissions of $8.6 million and deferred offering costs of $0.3 million.

On November 10, 2021 the Company completed a follow-on public offering, in which it issued and sold 1,300,000 shares of its common stock, resulting in net proceeds to the Company of $279.0 million after deducting underwriting discounts and commissions of $13.2 million and deferred offering costs of $0.3 million.

At-The-Market offering

On May 4, 2022, the Company entered into a Sales Agreement ("Sales Agreement"), with Stifel, Nicolaus & Company, Incorporated ("Stifel"), under which the Company may offer and sell from time to time at its sole discretion, up to an aggregate of 800,000 shares of its common stock, par value $0.0001 per share, through Stifel as its sales agent. The Company intends to use the net proceeds from the shares of common stock offered and sold to primarily replenish funds expended to satisfy anticipated tax withholding and remittance obligations related to the net settlement upon vesting of restricted stock unit awards ("RSU") granted to employees under the equity incentive plans. The Company has filed a prospectus supplement pursuant to the Sales Agreement for the offer and sale of up to an aggregate of 800,000 shares of its common stock. Subject to the terms and conditions of the Sales Agreement, Stifel will sell the common stock from time to time, based upon instructions from the Company. The Company agreed to pay Stifel a commission of up to 3% of the gross sales proceeds of any common stock sold through Stifel under the Sales Agreement. During the year ended December 31, 2022, the Company sold 225,334 shares of its common stock to Stifel under the Sales Agreement at a weighted average price of $150.78 per share resulting in net proceeds to the Company of $33.0 million, after deducting underwriting discounts and commissions of $0.7 million and deferred offering costs of $0.2 million.

9. Stock-based Compensation

SiTime Corporation 2019 Stock Incentive Plan

Upon completion of its IPO in November 2019, the Company adopted the SiTime Corporation 2019 Stock Incentive Plan (the "2019 Plan"). The 2019 Plan provides for the grant of incentive stock options, non-statutory stock options, restricted stock awards, restricted stock unit awards, stock appreciation rights, performance stock awards, and other forms of equity compensation (collectively, “stock awards”), and cash awards, all of which may be granted to employees (including officers), directors, and consultants or affiliates. Awards granted under the 2019 Plan vest at the rate specified by the plan administrator, for restricted stock unit awards primarily within the quarter to four years. As of December 31, 2022, 0.8 million shares were available for future issuance.

SiTime Corporation 2022 Inducement Award Plan

In February 2022, the Company adopted the SiTime Corporation 2022 Inducement Award Plan (the "2022 Plan"), which initially reserved 250,000 shares of the Company's common stock. The 2022 Plan provides for the grant of incentive stock options, non-statutory stock options, restricted stock awards, restricted stock unit awards, stock appreciation rights, and other forms of equity compensation and cash awards, all of which may be granted to employees (including officers). Awards granted under the 2022 Plan vest at the rate specified by the plan administrator, for restricted stock unit awards primarily over one to four years. As of December 31, 2022, 27,000 shares were available for future issuance.

Bonus and Retention Plans

On August 4, 2020, the Compensation Committee of the Company adopted and approved the Executive Bonus and Retention Plan. In August 2020, the Compensation Committee approved target bonus amounts and performance goals for the second half of the fiscal year 2020 (the “2020 Goals”). In each of January and July 2021, the Compensation Committee approved target bonus amounts and performance goals for the first half and second half, respectively, of the fiscal year 2021 (the “2021 Goals”). In January and August 2022, the Compensation Committee approved target bonus amounts and performance goals for the first half of the fiscal year 2022 (the “2022 Goals”). The 2020 Goals, 2021 Goals, and 2022 Goals are based on the achievement of revenue and Non-GAAP operating profit which excludes certain costs such as stock based compensation costs, as well as individual performance goals. The awards for the actual payouts are granted in the quarter following the end of the performance period. The target bonuses were granted based on a fixed dollar amount to be settled in RSUs on the vesting date and hence the awards have been classified as liability-based awards until settled. Such expense is included in the non-cash adjustment within stock-based compensation expense on the consolidated cash flow statements. The liability of $0.8 million for the 2022 Goals was recorded as accrued expenses and other current liabilities in the consolidated balance sheet as of December 31, 2022. Actual payouts ranged from 119% to 144% of target for the 2020 Goals, ranged from 76% to 150% of target for the 2021 Goals, and ranged from 44% to 130% of target for the 2022 Goals, in each case based on performance.

In April 2022, the Company adopted a bonus plan for certain employees. The target bonuses are granted based on a fixed dollar amount to be settled in RSUs in the quarter following the end of the performance period. Due to the fixed dollar amount targets, the awards have been classified as liability-based awards until settled. Once settled, these awards are reflected as RSU granted in the above table. Such expense is included in the non-cash adjustment within stock-based compensation expense on the consolidated cash flow statements and was $2.1 million for the year ended December 31, 2022. The liability of $0.8 million was recorded as accrued expenses and other current liabilities in the consolidated balance sheet as of December 31, 2022.

On December 17, 2021, the Compensation Committee of the Company approved performance based restricted stock unit awards ("PRSU") with performance goals for the year 2022 (the “PRSU 2022 Goals”). The PRSU 2022 Goals are based on the achievement of revenue, which were not met for the year ended December 31, 2022.

In February 2022, the Compensation Committee of the Company approved and granted to certain of the Company’s executive officers MYPSUs with vesting based on achievement of stock price targets, which are measured based on the 60-trading day average per share closing price of the Company’s common stock on the Nasdaq Global Market during the performance periods of up to six years from the date of grant, subject to the continued service of the grantee through the vest date. The grant-date fair value of each MYPSU was determined using Monte Carlo simulation model. The assumptions used in the Monte Carlo simulation included expected volatility of 44.4%, risk free rate of 1.83%, no expected dividend yield, expected term of six years and possible future stock prices over the performance period based on historical stock and market prices. The Company recognizes the expense related to the MYPSUs on a graded-vesting method over the requisite service period.

In the year ended December 31, 2020, the Company granted CRSUs as part of an employee bonus plan. The Company ended this program effective April 1, 2021. Generally, such units were granted quarterly and fully vested at the end of the quarter they were granted except units granted to new hires that had a one-year cliff vesting. Such awards were classified as liability-based awards.

The following table summarizes the RSU, PRSU, and MYPSU awards activity for the years ended December 31, 2022, 2021 and 2020:

	RSU		PRSU		MYPSU	
	Number of Shares	Grant Date Fair Value per share	Number of Shares	Grant Date Fair Value per share	Number of Shares	Grant Date Fair Value per share
Unvested at December 31, 2019	2,989,322	$ 13.0	—	—	—	$ —
Granted	682,517	53.4	—	—	—	—
Vested	(766,934)	15.5	—	—	—	—
Forfeited	(169,199)	13.7	—	—	—	—
Unvested at December 31, 2020	2,735,706	$ 22.4	—	—	—	$ —
Granted	438,474	128.6	58,954	261.4	—	—
Vested	(874,462)	27.9	—	—	—	—
Forfeited	(72,521)	33.3	—	—	—	—
Unvested at December 31, 2021	2,227,197	$ 40.6	58,954	261.4	—	$ —
Granted	468,703	188.3	—	—	311,872	88.6
Vested	(919,530)	44.4	—	—	—	—
Forfeited	(58,376)	111.8	—	—	—	—
Unvested at December 31, 2022	1,717,994	$ 73.6	58,954	$ 261.4	311,872	$ 88.6

The difference between the number of RSUs vested and the shares of common stock issued during the year ended December 31, 2022 and 2020 is the result of RSUs withheld in satisfaction of minimum tax withholding obligations associated with the vesting. The total fair value, as of the vesting date, of awards vested during the years ended December 31, 2022, 2021, and 2020 were $40.5 million, $161.2 million, and $43.7 million, respectively.

Total stock-based compensation expense for employees recognized in the consolidated statements of operations and comprehensive income (loss) was as follows:

	Year Ended December 31,		
	2022	2021 (in thousands)	2020
Equity based awards			
Cost of revenue	$ 1,861	$ 1,654	$ 613
Research and development	23,024	11,087	4,682
Selling, general and administrative	28,177	14,422	9,521
	$ 53,062	$ 27,163	$ 14,816
Liability based awards - to be settled in equity			
Cost of revenue	$ 121	$ 114	$ —
Research and development	2,214	492	445
Selling, general and administrative	2,018	2,223	748
	$ 4,353	$ 2,829	$ 1,193
Total stock-based compensation - equity and liability based	$ 57,415	$ 29,992	$ 16,009
Liability-based awards - cash settled			
Cost of revenue	$ —	$ 102	$ 264
Research and development	—	143	415
Selling, general and administrative	—	108	278
	$ —	$ 353	$ 957
Total stock-based compensation expense	$ 57,415	$ 30,345	$ 16,966
Stock-based compensation expense recorded to additional paid-in capital			
Equity based awards	$ 53,062	$ 27,163	$ 14,816
Liability based awards - settled in equity	4,189	2,531	-
Total stock-based compensation expense recorded to additional paid-in capital	$ 57,251	$ 29,694	$ 14,816

The following table presents the unrecognized compensation costs and related weighted average period of recognition as of December 31, 2022:

	As of December 31, 2022	
	Unrecognized Compensation Costs (in millions)	Weighted Average Period of Recognition (in years)
RSUs	$ 114.5	2.1
PRSUs	-	—
MYPSUs	19.2	1.7
Liability-based awards	0.3	0.6
Total unrecognized compensation costs	$ 134.0	

10. Income Taxes

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

	Years Ended December 31,		
	2022	2021	2020
		(in thousands)	
United States	$ 22,208	$ 32,379	$ (9,645)
Foreign	1,128	(24)	274
	$ 23,336	$ 32,355	$ (9,371)

The components of income tax expense were as follows:

	Years Ended December 31,		
	2022	2021	2020
		(in thousands)	
Current Provision:			
Federal	$ -	$ (11)	$ -
State	(1)	(1)	(1)
Foreign	(81)	(66)	—
Total current provision	(82)	(78)	(1)
Total deferred provision	—	—	—
Total income tax provision	$ (82)	$ (78)	$ (1)

The material components of the deferred tax assets and liabilities consisted of net operating loss carry-forwards and tax credit carry-forwards.

	Years Ended December 31,		
	2022	2021	2020
		(in thousands)	
Deferred tax assets (liabilities):			
Accrual, write-down and other	$ 5,433	$ 5,442	$ 2,469
Section 174 Costs	23,513	-	-
Depreciation and amortization	(1,576)	(818)	76
Credits	5,657	-	-
Net operating loss and credits carry forwards	49,647	64,690	42,949
Total gross deferred tax assets (liabilities)	82,674	69,314	45,494
Valuation allowance	(82,674)	(69,314)	(45,494)
Total net deferred tax assets	$ —	$ —	$ —

The net valuation allowance increased by $13.1 million for the year ended December 31, 2022.

A reconciliation of the Company's effective tax rate to the statutory U.S. federal rate is as follows:

	Years Ended December 31,		
	2022	2021	2020
US Federal Rate	21.0%	21.0%	21.0%
RSU excess tax expense	(88.6)	(79.0)	93.3
Permanent differences and others	10.9	15.7	(2.9)
Change in valuation allowance	57.0	42.3	(111.4)
	0.3%	0.0%	0.0%

The reported amount of income tax expense differs from an expected amount based on statutory rates primarily due to the Company's valuation allowance.

As of December 31, 2022 and 2021, based on the available objective evidence, management believes it is more likely than not that the net deferred tax assets will not be realized. Accordingly, management has applied a full valuation allowance against its net deferred tax assets at December 31, 2022 and 2021.

At December 31, 2022 and 2021, the Company has federal net operating loss carry-forwards of approximately $213.3 million and $259.6 million, respectively, and state net operating loss carry-forwards of approximately $65.3 million and $64.5 million, respectively. At December 31, 2022 and 2021, the Company has net operating loss carryforwards for foreign income tax purposes of approximately $1.7 million and $2.3 million, respectively. These federal, state, and foreign net operating loss carry-forwards will expire beginning in 2025, 2028, and 2028, respectively.

At December 31, 2022 and 2021, the Company also has federal research and development tax credit carry-forwards of approximately $3.9 million and $3.9 million, respectively, and state research and development tax credit carry-forwards of approximately $3.6 million and $3.6 million, respectively. The federal tax credits begin to expire in 2025, and the California tax credits carry forward indefinitely.

Utilization of the net operating loss carry-forwards and credits may be subject to a substantial annual limitation due to the ownership change limitations provided by the Internal Revenue Code of 1986, as amended ("the Code"), and similar state provisions. The annual limitation may result in the expiration of net operating losses and credits before utilization.

As of December 31, 2022 and 2021, the Company had $2.3 million and $2.4 million of total unrecognized tax benefits. The Company currently has a full valuation allowance against its net deferred tax assets which would impact the timing of the effective tax rate benefit should any of these uncertain tax positions be favorably settled in the future. If the Company is able to eventually recognize these uncertain tax positions, none of the unrecognized benefit would reduce the Company's effective tax rate due to full valuation allowance of the Company's deferred tax assets. The Company's policy is to record interest and penalties related to unrecognized tax benefits as income tax expense. During the years ended December 31, 2022 and 2021, the Company had immaterial amounts related to the accrual of interest and penalties.

A reconciliation of the beginning and ending unrecognized tax benefit amount is as follows:

	December 31,	
	2022	2021
	(in thousands)	
Beginning balance	$ 2,431	$ 2,436
Increase (decrease) in balance related to tax position taken during prior periods	—	—
Increase (decrease) in balance related to tax position taken during the current period	(129)	(5)
Ending balance	$ 2,302	$ 2,431

The Company does not have any tax positions for which it is reasonably possible the total amount of gross unrecognized tax benefits will increase or decrease within 12 months of the years ended December 31, 2022 and 2021.

The Company files tax returns as prescribed by the tax laws of the jurisdictions in which it operates. In the normal course of business, the Company is subject to examination by federal, state, local, and foreign jurisdictions, where applicable. Due to the Company's net losses, its federal, state and local, and foreign tax returns since inception are subject to audit.

11. 401(k) Plan

The Company has a 401(k) retirement plan for the U.S. based employees that qualifies as a defined contribution plan. All U.S. based employees are eligible to participate on the first day of the month following their hire date with the Company. Under the defined contribution plan, employees may contribute up to the lesser of 90% of their pre-tax salaries per year or the maximum contribution allowed under the Code. The Company may make discretionary matching contributions, if deferral contributions are made by the employees. The Company's matching contributions for the years ended December 31, 2022, 2021, and 2020 resulted in expense of $1.3 million, $1.0 million, and $0.6 million respectively.

In addition, other eligible employees outside of the U.S. receive retirement benefits under various statutory plans.

12. Segment Information and Operations by Geographic Area

The Company operates in one reportable segment related to the design, development, and sale of silicon timing systems solutions. The chief operating decision maker, for the Company is the Chief Executive Officer. The Company's Chief Executive Officer reviews operating results on an aggregate basis and manages the Company's operations as a whole for the purpose of evaluating financial performance and allocating resources. Accordingly, the Company has determined that it has a single reportable and operating segment structure.

Revenue by geographic area are presented based upon the ship-to location of the original equipment manufacturers, the contract manufacturers, or the distributors who purchased the Company's products. For sales to the distributors, their geographic location may be different from the geographic locations of the ultimate end customers. The following table sets forth revenue by country for countries with 10% or more of the Company's revenue during any of the periods presented:

	Year Ended December 31,		
	2022	2021	2020
		(in thousands)	
Taiwan	$ 101,849	$ 66,390	$ 55,789
Hong Kong	59,209	82,503	30,306
United States	33,470	14,221	8,522
Other	89,077	55,694	21,539
Total	$ 283,605	$ 218,808	$ 116,156

The following table sets forth the Company's total property and equipment attributable to operations by country for countries with 10% or more of the Company's net property and equipment as of the periods presented:

	As of	
	December 31, 2022	December 31, 2021
	(in thousands)	
United States	$ 24,211	$ 19,205
Malaysia	18,524	13,780
Taiwan	5,570	2,367
Other	10,467	2,550
Total	$ 58,772	$ 37,902

13. Related Party Transactions

The Company entered into an agreement with MegaChips Corporation ("MegaChips"), whereby the Company appointed MegaChips as a non-exclusive sales representative of its products in Japan. The Company sold products through MegaChips to distributors, resellers, or direct customers in Japan. The Company paid MegaChips a fixed percentage of the revenue as sales commission, which was recorded as commission expense and included in sales and marketing in the consolidated statements of operations and comprehensive loss. In connection with the Company's efforts to contract directly with distributors in Japan, the Company entered into a termination agreement with MegaChips pursuant to which the Company and MegaChips mutually terminated the Distribution Agreement effective November 3, 2021.

The Company also entered into a service and secondment agreement with MegaChips LSI USA Corporation, a wholly owned subsidiary of MegaChips, in 2020 that terminated on August 31, 2021.

MegaChips has been the largest stockholder of the Company and held approximately 23.0% and 24.0% of the Company’s outstanding common stock as of December 31, 2022 and December 31, 2021, respectively.

In May 2021, the Company signed a consulting agreement with Akira Takata, a member of the Board of Directors of the Company. As a consultant, Mr. Takata provided sales consulting services through December 31, 2021, for which he received monthly cash fees of $5,000, reimbursement of expenses, and an equity award of 500 RSUs that fully vested on November 20, 2021. In December 2021, the Company signed an amendment to extend the consulting agreement with Akira Takata through December 31, 2022, for which he received monthly cash fees, reimbursement of expenses, and an equity award of 300 RSUs that fully vested on November 20, 2022.

The following is a summary of significant balances, transactions and payments with the related parties and affiliates.

Transactions	Year Ended December 31, 2022	2021	2020
		(in thousands)	
MegaChips			
Sales through distribution agreement	$ —	$ 8,167	$ 5,714
License expense	—	—	148
Commission expense	—	340	228
Affiliates			
Consulting fees	189	254	380

Payments	Year Ended December 31, 2022	2021	2020
		(in thousands)	
MegaChips			
Cash paid for commissions	$ —	$ 340	$ 228
Cash paid for licenses	—	—	25
Affiliates			
Cash paid for consulting fees	189	254	380

14. Subsequent Events

Amendment of Inducement Plan

On February 21, 2023, the Compensation Committee of the Board of Directors of SiTime (the “Committee”) approved an amendment and restatement of the SiTime Corporation 2022 Inducement Award Plan (the “Inducement Plan”). The Inducement Plan provides for the grant of equity or equity-based awards in the form of non-qualified stock options, restricted stock units, and other stock-based awards. The Inducement Plan’s terms are substantially similar to the terms of SiTime’s 2019 Stock Incentive Plan, with the addition of certain terms and conditions intended to comply with the Nasdaq inducement award exception. The Inducement Plan was adopted by the Committee without stockholder approval pursuant to Rule 5635(c)(4) of the Nasdaq Listing Rules.

The Committee amended and restated the Inducement Plan to increase the reserve by 250,000 shares of SiTime’s common stock for issuance pursuant to awards granted under the Inducement Plan (subject to customary adjustments in the event of a change in capital structure of SiTime). Awards under the Inducement Plan may be granted only to individuals who were not previously employees or directors of SiTime, or following a bona fide period of non-employment with SiTime, who satisfy the standards for inducement grants under Rule 5635(c)(4) of the Nasdaq Listing Rules, and only when the award is an inducement material to such individual’s entering into employment with SiTime, its subsidiaries or its affiliates within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures.

We maintain "disclosure controls and procedures," as such term is defined in Rules 13a-15 (e) and 15d – 15(e) under the Exchange Act, that are designed to provide reasonable assurance that information required to be disclosed by us in reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our Chief Executive Officer (principal executive officer) and Chief Financial Officer (principal financial officer), as appropriate, to allow for timely decisions regarding required disclosure.

Based on their evaluation as of the end of the period covered by this Annual Report on Form 10-K, our Chief Executive Officer and Chief Financial Officer have concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control over Financial Reporting; Attestation Report of the Registered Public Accounting Firm.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act. Our 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 GAAP. Our 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 our assets, (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors, and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

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

Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022 based on the criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, or COSO. Based on our evaluation under the criteria set forth in Internal Control - Integrated Framework (2013) issued by the COSO, our management concluded our internal control over financial reporting was effective as of December 31, 2022.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2022 has been audited by BDO USA, LLP, an independent registered public accounting firm, as stated in their report and is incorporated herein by reference.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended December 31, 2022 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
SiTime Corporation
Santa Clara, CA

Opinion on Internal Control over Financial Reporting

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

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2022 and 2021, the related consolidated statements of operations and comprehensive income (loss), stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2022, and the related notes and financial statement schedule listed in the accompanying index and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

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

We conducted our audit of internal control over financial reporting in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ BDO USA, LLP
San Jose, California
February 27, 2023

Item 9B. Other Information.

Amendment of Inducement Plan

On February 21, 2023, the Compensation Committee of the Board of Directors of SiTime (the "Committee") approved an amendment and restatement of the SiTime Corporation 2022 Inducement Award Plan (the "Inducement Plan"). The Inducement Plan provides for the grant of equity or equity-based awards in the form of non-qualified stock options, restricted stock units, and other stock-based awards. The Inducement Plan's terms are substantially similar to the terms of SiTime's 2019 Stock Incentive Plan, with the addition of certain terms and conditions intended to comply with the Nasdaq inducement award exception. The Inducement Plan was adopted by the Committee without stockholder approval pursuant to Rule 5635(c)(4) of the Nasdaq Listing Rules.

The Committee amended and restated the Inducement Plan to increase the reserve by 250,000 shares of SiTime's common stock for issuance pursuant to awards granted under the Inducement Plan (subject to customary adjustments in the event of a change in capital structure of SiTime). Awards under the Inducement Plan may be granted only to employees who satisfy the standards for inducement grants under Rule 5635(c)(4) of the Nasdaq Listing Rules, and only when the award is an inducement material to such individual's entering into employment with SiTime, its subsidiaries or its affiliates within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item will be set forth under the captions “Election of Directors – Directors and Nominees” and “Election of Directors – Executive Officers, Directors and Director Nominees” in our definitive proxy statement to be filed with the SEC, in connection with our 2023 annual meeting of stockholders (the “Proxy Statement”), which is expected to be filed not later than 120 days after the end of our fiscal year ended December 31, 2022, and is incorporated in this report by reference.

Information regarding Section 16(a) beneficial reporting compliance, if any, will be set forth under the section entitled “Delinquent Section 16(a) Reports” in the Proxy Statement and is incorporated herein by reference.

We have adopted a Code of Business Conduct and Ethics that applies to all of our officers and employees, including our chief executive officer, chief financial officer, corporate controller, and other employees who perform financial or accounting functions. The Code of Business Conduct and Ethics sets forth the basic principles that guide the business conduct of our employees and is available on our website at www.sitime.com. We have also adopted a Code of Ethics for Senior Financial Officers that specifically applies to our chief executive officer (our principal executive officer) and chief financial officer (our principal financial officer and principal accounting officer). Stockholders may request a free copy of our Code of Ethics for Senior Financial Officers by contacting us at SiTime Corporation, Attention: Investor Relations, 5451 Patrick Henry Drive, Santa Clara, California 95054.

To date, there have been no waivers under our Code of Business Conduct and Ethics or Code of Ethics for Senior Financial Officers. We will disclose on our website amendments to, or waivers from, our Code of Business Conduct and Ethics, in accordance with applicable laws and regulations.

The information concerning our Audit Committee and Audit Committee financial expert is incorporated by reference herein to the information set forth under the caption “Corporate Governance – Board Committee – Audit Committee” in our Proxy Statement.

Information regarding procedures by which stockholders may recommend nominees to our board of directors is set forth under the caption “Corporate Governance - Director Nominations” in the Proxy Statement.

Item 11. Executive Compensation.

The information required by this item will be set forth under the captions “Executive Compensation,” “Non-Employee Director Compensation,” "Corporate Governance," "Compensation Committee Interlocks and Insider Participation," and "Compensation Committee Report" in the Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth under the caption “Security Ownership of Certain Beneficial Owners and Management” and “Equity Compensation Plan Information,” in the Proxy Statement and is incorporated herein by reference.

Equity Compensation Plan Information

The following table summarizes our equity compensation plan information as of December 31, 2022. Information is included for equity compensation plans approved by our stockholders as well as our 2022 Inducement Award Plan (the “Inducement Plan”) adopted by our compensation committee without approval of our stockholders. The Inducement Plan provides for the grant of equity or equity-based awards in the form of non-qualified stock options, restricted stock units, and other stock-based awards. The Inducement Plan’s terms are substantially similar to the terms of SiTime's 2019 Stock Incentive Plan, with the addition of certain terms and conditions intended to comply with the Nasdaq inducement award exception. Awards under the Inducement Plan may be granted only to employees who satisfy the standards for inducement grants under Rule 5635(c)(4) of the Nasdaq Listing Rules, and only when the award is an inducement material to such individual's entering into employment with us, our subsidiaries or our affiliates within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules.

Plan Category	**Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights**	**Weighted Average Exercise Price of Outstanding Options, Warrants and Rights[(1)]**	**Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in the first Column)**
Equity compensation plans approved by stockholders[(1)]	1,867,071	$ —	754,827
Equity compensation plans not approved by stockholders[(2)]	221,749	-	27,213
Total	2,088,820	$ -	782,040

(1) Consists solely of our 2019 Stock Incentive Plan (the "2019 Stock Plan"). The 2019 Stock Plan contains an "evergreen" provision, pursuant to which the number of shares of common stock reserved for issuance pursuant to awards under such plan shall be increased on the first day of each year beginning in 2020, equal to the lesser of (i) 3% of the number of shares of common stock outstanding on the last day of the immediately preceding year, or (ii) if our Board acts prior to the first day of the year, such lesser amount that our Board determines for purposes of the annual increase of the year such number as determined by the plan administrator. As of January 1, 2023, the 2019 Stock Plan was increased by 651,048 shares pursuant to such evergreen provision. We have only granted RSUs from the 2019 Stock Plan, which have no exercise price.

(2) Consists solely of our Inducement Plan. We have only granted RSUs from the Inducement Plan, which have no exercise price.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be set forth under the captions "Certain Relationships and Related Person Transactions" and "Corporate Governance — Director Independence" in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be set forth under the caption "Ratification of the Appointment of Independent Registered Public Accountants — Principal Accounting Fees and Services" in the Proxy and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as a part of this Annual Report on Form 10-K:

1. Financial Statements:

2. Financial Statement Schedule (Valuation and Qualifying Accounts) for the years ended December 31, 2022, 2021, and 2020:

3. Exhibits:

The documents listed below are filed (or furnished, as noted) as exhibits to this Annual Report on Form 10-K:

Exhibit Index

Exhibit Number	Exhibit Description	Incorporation by Reference: Form	File Number	Exhibit/Appendix Reference	Filing Date	Filed Herewith
3.1	Restated Certificate of Incorporation of SiTime Corporation	8-K	001-39135	3.1	11/26/2019	
3.2	Amended and Restated Bylaws of the Company	8-K	001-39135	3.2	6/29/2021	
4.1	Form of Common Stock Certificate of the Company	S-1	333-234305	4.1	10/23/2019	
4.2	Description of Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934	10-K	001-39135	4.2	2/16/2021	
10.1+	Form of Indemnification Agreement between the Company and its directors and officers	10-K	001-39135	10.1	2/16/2021	
10.2+	2019 Stock Incentive Plan and Forms of Stock Option Agreement, Notice of Exercise, Stock Option Grant Notice, Restricted Stock Unit Agreement, and Restricted Stock Agreement thereunder	S-1	333-234305	10.2	10/23/2019	
10.3+	New Terms of Employment, dated October 21, 2014, between Rajesh Vashist and the Company	S-1	333-234305	10.3	10/23/2019	
10.4+	Amendment to Terms of Employment Letter, dated June 14, 2016, between Rajesh Vashist and the Company	S-1	333-234305	10.4	10/23/2019	
10.5+	Offer of Employment, dated September 24, 2019, between Arthur D. Chadwick and the Company	S-1	333-234305	10.5	10/23/2019	
10.6+	Offer of Employment, dated January 27, 2018, between Lionel Bonnot and the Company	S-1	333-234305	10.6	10/23/2019	
10.7+	New Terms of Employment, dated October 20, 2014, between Piyush B. Sevalia and the Company	S-1	333-234305	10.7	10/23/2019	

10.8+	Change of Control and Severance Agreement, between the Company and Rajesh Vashist	S-1	333-234305	10.8	10/23/2019
10.9+	Form of Change of Control and Severance Agreement, between the Company and its Executives	S-1	333-234305	10.9	10/23/2019
10.12	Integration and Purchase Agreement, dated March 15, 2019, between the Company and MegaChips Corporation	S-1	333-234305	10.16	10/23/2019
10.13	Lease, dated April 15, 2016, between the Company and Batton Associates, LLC	S-1	333-234305	10.17	10/23/2019
10.14*	License Agreement, dated August 1, 2018, between the Company and Robert Bosch LLC	S-1	333-234305	10.18	10/23/2019
10.15*	Amended and Restated Manufacturing Agreement, dated February 23, 2017, between the Company and Robert Bosch LLC	S-1	333-234305	10.19	10/23/2019
10.16*	Amendment No. 1 to Amended and Restated Manufacturing Agreement, dated August 1, 2018, between the Company and Robert Bosch LLC	S-1	333-234305	10.20	10/23/2019
10.18*	Asset purchase agreement dated February 20, 2020, by and among MegaChips Taiwan Corporation and SiTime Corporation	10-Q	001-39135	10.2	5/7/2020
10.19+	Offer of Employment, dated June 5, 2020, between Vincent P. Pangrazio and SiTime Corporation	8-K	001-39135	10.1	6/9/2020
10.20+	Executive Bonus and Retention Plan	10-Q	001-39135	10.2	8/6/2020
10.21*	Asset Purchase Agreement dated August 4, 2020, by and among MegaChips Corporation and SiTime Corporation	10-Q	001-39135	10.3	8/6/2020
10.22+	Offer of Employment dated November 16, 2020, between Fari Assaderaghi and SiTime Corporation	10-K	001-39135	10.22	2/16/2021

10.23+	Independent Director Compensation Policy	10-K	001-39135	10.23	2/16/2021	
10.24+	Letter Agreement dated April 1, 2021 between Christine Heckart and SiTime Corporation	8-K	001-39135	10.1	4/5/2021	
10.25+	Consulting Agreement, dated May 15, 2021, between Akira Takata and SiTime Corporation	10-Q	001-39135	10.2	8/5/2021	
10.26+	Amendment No. 1 to Consulting Agreement, dated December 30, 2021, between Akira Takata and SiTime Corporation	10-K	001-39135	10.26	2/25/2022	
10.27	First Amendment to Lease, dated January 7, 2021, between Batton Associates, LLC and SiTime Corporation	10-Q	001-39135	10.1	11/4/2021	
10.28+	Letter Agreement, dated October 18, 2021, between Rajesh Vashist and SiTime Corporation	10-K	001-39135	10.28	2/25/2022	
10.29+	Amendment to Letter Agreement dated October 11, 2022, between Rajesh Vashist and SiTime Corporation					X
10.30+	SiTime Corporation Amended and Restated 2022 Inducement Award Plan and Form of Restricted Stock Unit Agreement					X
10.31	Sales Agreement dated May 4, 2022 between SiTime Corporation and Stifel, Nicolaus & Company, Incorporated	S-K	001-39135	1.1	5/4/22	
21.1	Subsidiaries of the Company					X
23.1	Consent of BDO USA, LLP, Independent Registered Public Accounting Firm					X
24.1	Power of Attorney (see signature page hereto)					X
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Exchange Act, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X

31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Exchange Act, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X
32.1#	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X
32.2#	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X
101.INS	XBRL Instance Document	X
101.SCH	XBRL Taxonomy Extension Schema Document	X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	X

All references in the table above to previously filed documents or descriptions are incorporating those documents and descriptions by reference thereto.

All references to documents filed as exhibits to periodic reports are to periodic reports of SiTime Corporation, SEC File No. 001-39135.

+ Indicates a management contract or compensatory plan.

* Portions of this exhibit have been omitted in accordance with Item 601 of Regulation S-K.

In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release No. 34-47986, the certifications furnished in Exhibits 32.1 and 32.2 hereto are deemed to accompany this Form 10-K and will not be deemed “filed” for purposes of Section 18 of the Exchange Act or deemed to be incorporated by reference into any filing under the Exchange Act or the Securities Act of 1933 except to the extent that the Company specifically incorporates it by reference.

Item 16. Form 10-K Summary.

None

SCHEDULE II
VALUATION AND QUALIFYING ACCOUNTS

	Valuation and Qualifying Accounts			
	Balance at Beginning of Period	Additions Charged to Expenses or Other Accounts	Deductions Credited to Expenses or Other Accounts	Balance at End of Period
	(in thousands)			
Allowance for credit losses				
Year Ended December 31, 2022	$ 50	$ —	$ —	$ 50
Year Ended December 31, 2021	$ 50	$ —	$ —	$ 50
Year Ended December 31, 2020	$ 129	$ —	$ (79)	$ 50
Deferred tax valuation allowance				
Year Ended December 31, 2022	$ 69,314	$ 13,360	$ —	$ 82,674
Year Ended December 31, 2021	$ 55,951	$ 13,363	$ —	$ 69,314
Year Ended December 31, 2020	$ 45,494	$ 10,457	$ —	$ 55,951

SIGNATURES

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

SiTime Corporation

Date: February 27, 2023

By: /s/ Arthur D. Chadwick

Arthur D. Chadwick

Executive Vice President, Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Rajesh Vashist and Arthur D. Chadwick, and each of them, as his or her true and lawful attorneys-in-fact and agents, each with the full power of substitution, for him or her and in his or her name, place, or stead, in any and all capacities, to sign any and all amendments to this Report, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

Name	Title	Date
/s/ Rajesh Vashist **Rajesh Vashist**	Chief Executive Officer and Director *(Principal Executive Officer)*	February 27, 2023
/s/ Arthur D. Chadwick **Arthur D. Chadwick**	Executive Vice President, Chief Financial Officer *(Principal Financial and Accounting Officer)*	February 27, 2023
/s/ Raman K. Chitkara **Raman K. Chitkara**	Director	February 27, 2023
/s/ Edward H. Frank **Edward H. Frank**	Director	February 27, 2023
/s/ Torsten G. Kreindl **Torsten G. Kreindl**	Director	February 27, 2023
/s/ Katherine E. Schuelke **Katherine E. Schuelke**	Director	February 27, 2023
/s/ Akira Takata **Akira Takata**	Director	February 27, 2023
/s/ Christine Heckart **Christine Heckart**	Director	February 27, 2023
/s/ Tom D. Yiu **Tom D. Yiu**	Director	February 27, 2023