MELE

A MECCAH IN-WAIT

A MAIDEN FINANCIAL REPORT

www.maidenfinancial.io / info@maidenfinancial.io

DISCLAIMER

This report is the property of Maiden Financial, Ltd. Distribution, excerption, or replication of any part of this report is strictly prohibited, unless explicit consent is provided by Gwen Hofmeyr, 'the Author.' Maiden Financial, Ltd will defend the theft or misuse of its intellectual property to the fullest extent permissible by law. The material included in this report, inclusive of any views expressed by the Author, is solely intended for informational purposes, and does not purport to be the provisionary of financial advice, a general investing guide, nor is it representative of any recommendation to buy or sell a security. The material contained in this report includes certain estimates, projections, and statements with respect to, among other things, anticipations about the forward operational and/or stock performance of Melexis NV, Texas Instruments, Infineon AG, and Allegro Microsystems that are subject to a host of uncertainties, such as, but not limited to, economic, environmental, regulatory, and competitive uncertainties, as well as managerial and other uncertainties and contingencies solely included for illustrative purposes. **Investment in marketable securities is subject to risk, and may result in unrecoverable losses**. There is no guarantee that the information provided in this report is fully accurate or will remain accurate beyond its date of publishing. While the Author considers the information provided in this report to be dependable, its material should not be relied upon as an accurate or valid source of information. **As such, Maiden Financial, Ltd and its affiliates (collectively, "We") will not be liable for any damages, losses, or costs that you may incur by using or relying upon the information provided in this report. Use of any information provided in this report constitutes an agreement to do so at your own risk.** Note, historical performance is not a reliable predictor of future results, and the prices of securities may be subject to material volatility. It is the opinion of the author that users should seek financial counsel from a registered investment advisor prior to making investment-related decisions.

PUBLISHED 04/24/2025

Acknowledgement

A sincere thank you to my intern, Diego Gedge, who, despite being a full-time student at Toronto Metropolitan University, dedicated hours of his time to help with the collection of data vital to this report.

TABLE OF CONTENTS

PREFACE

Explaining My Thinking

Dear members,

By popular request, I have decided to share the reasons why I find a company compelling prior to a report's introduction, so that the reader may have a more direct understanding of my thinking. These disclosures will be short and brief, as it is my intent that Maiden's reports solely serve to provide information, so that members may make their own informed decisions.

What you are about to read is a report on a Belgian company called Melexis, which is the world's number one producer of magnetic latch & switch and position sensors for the automotive industry. The global sensor industry at-large is presently in a downturn, due to overcapacity built in the wake of the Covid-19 Pandemic. These businesses tend to have above average economics, conservative balance sheets, and belong to industry sub-segments with strong barriers to entry.

As with Palfinger, I tend to favor businesses that belong to industries where, despite being subject to periods of cyclical uncertainty, benefit from long-term, *necessary* demand. In other words, the world *needs* the products and services that these companies and industries provide for practical purposes.

Consider the companies that Maiden presently covers:

- Hingham Institution for Savings: People *need* a place to live; and, for an economy to function properly, it requires trustworthy bankers to underwrite creditworthy loans.
- Ingles Markets: People *need* to eat.
- Palfinger: People *need* to lift and efficiently transport materials and goods.

When economic necessity is present, and that necessity is coupled with favorable cross-cycle economics, incremental long-term demand is likely. As a result, it is psychologically easier to purchase share in such companies when uncertainty is present, with the knowledge that future demand is likely to revert to some degree.

In addition, volatility in the price of "necessary cyclicals," in reaction to short to medium-term cyclicality, is often so severe that even subnormal forward economics can produce attractive returns. This reduces the significance of current earnings and shifts an investor's attention towards balance sheet quality. If the financial health of a necessary cyclical is sufficient to weather a downturn without shareholder dilution, it reduces the burden of needing to accurately forecast future business economics, which is a risk that investors struggle to account for.

Moreover, purchasing in a downturn requires an investor to allocate capital when uncertainty is present. Wall Street largely avoids hocking uncertainty, as comfort and excitement, not uncertainty and resolve, are easier pills to shill. The irony of Wall Street's behavioral myopia is that it is price-focused, not business-focused, which encourages investors to discount long-term economic necessities in favor of short-term comfort.

"I can't predict the short-term movements of the stock market. I haven't the faintest idea as to whether stocks will be higher or lower a month or a year from now. What is likely, however, is that the market will move higher, perhaps substantially so, **well before either sentiment or the economy turns up**."
— Warren Buffett

Indeed, many of Warren Buffett's crown jewels have cyclical characteristics where sometimes they over-earn, and sometimes they under-earn, which frequently pairs with faster or slower growth.

For example, sometimes insurance premiums are more attractive for GEICO to underwrite, and sometimes they are not. This phenomenon does not make GEICO a bad business. It simply justifies the need to understand a company's cross-cycle economics as a means to more accurately price risk and return.

Regarding Melexis, at –50.9% off its 2021 high of €110.80, the market is currently pricing its cross-cycle economics favorably in response to supply-demand uncertainty. There is no evidence of terminal impairment, as the company's magnetic sensors are vital to the automotive industry. Couple the previous with low leverage, and the probability of permanent capital loss is low, even if Melexis significantly underperforms management's forward expectations.

As for the likelihood of additional price volatility, it is an afterthought. Like Berkshire Hathaway, Maiden bets on attractively priced, well-positioned businesses, not timing.

A note on Melexis' dividend: While it presently yields a healthy 4.77%, I do not pay it much consideration, as management tends to reduce dividend payments in downturns. I view prospective cuts as positive, as I do not feel that bowing to commitment and consistency tendency to satisfy the needs of income-seekers is prudent if it interferes with better uses of long-term capital.

That said, for those interested in the income they may receive through holding shares of Melexis, the US has a tax treaty with Belgium, and so does Canada. Foreign Canadian and American investors are subject to a withholding tax of 30% on dividends received, which should be deducted at the time of payment. I suggest that the reader review their respective country's tax treaty for any credits that may help reduce the burden of foreign taxation on earned income.

If you have any questions after reading the report, please reach out to me at

gwen@maidenfinancial.io. Otherwise, I look forward to discussing the report with Elite members in Maiden's post-report conference call.

EXECUTIVE SUMMARY

A Belgian Treasure

Most investors have heard of Texas Instruments, the world's largest producer of analog sensors. These sensors take physical data about the environment, be it speed, position, heat, or pressure, and convert it into digital information that is relevant for the functioning of various machinery, pieces of equipment, and consumer goods. There are at least twenty-seven different categories of analog sensor, defined by what they sense, or how they sense.

Melexis (EBR:MELE) LFY €MM	
Free Float:	50%
Share Price:	€54.35
3M Avg Volume:	73,358
Market Cap:	€2,196
Enterprise Value:	€2,385
Yield:	4.77%
Revenue:	€932.8
EBIT Margin:	23.6%
Net Margin:	21.2%
ROE	30.7%
ROCE:	28.7%
Debt/Tang. Equity:	39%
EBIT/Interest Exp:	15.1x
EV/EBIT:	10.85x
5Y Base Return:	10.5%
5Y Best Return:	24.2%

One machine where analog sensors are ubiquitous is in the automobile. Automakers are capital intensive, and struggle to create sustainable, cross-cycle shareholder value. Ford, Mercedes-Benz, BMW, General Motors, Toyota, Renault, Stellantis, and Volkswagen are all examples of this phenomenon.

There are standouts, like BYD, Tesla, and Ferrari, but generally speaking, automakers are a category of investment where consistent outperformance is not easily won. The story is different for analog sensor companies with large automotive exposure, like Texas Instruments, Infineon AG, and NXP, who have all generated satisfactory, long-term returns.

But the automotive sensor market is easily misunderstood.

Citations of market share commonly center on consolidated revenue that comprises

all automotive sensors, rather than on company share distribution related to specific sensor markets. The result leaves gaps in understanding the competitive nuances of producers who are only focused on a few market sub-segments.

Enter Melexis, a fabless, Belgian chip designer that specializes in producing magnetic latch & switch and position sensors for the automotive industry. These two types of sensors account for 74.1% of all of Melexis' products, which collectively dominate mid-end and upper-end automotive magnetic sensor markets.

Of Melexis' core competitors, Texas instruments is effectively absent from magnetic position sensor production, while Melexis' so-called "primary competitor," Allegro Microsystems, focuses on low-end automotive markets. This explains why Europe is Allegro's smallest market: Vehicles produced by Volkswagen, BMW, and Mercedes-Benz mostly fall into mid and high-end categories.

Meanwhile, Infineon, the second largest sensor producer in the world by sales, shares little overlap with Melexis in its core product markets. This news may surprise investors who review Infineon's materials, as the German sensor giant ranks Melexis fifth in its "addressable serviceable market."

The reality is that there is little for Infineon to compare to with regard to >83% of Melexis' products. The invalidity of the comparison is not necessarily dishonest, but it is a function of how broad citations of market share fail to account for sub-category nuances that often require extensive research to verify. It is simply easier to accept broad disclosures of market share at face value.

To verify Melexis' competitive prowess, a product analysis was conducted that compared of 871 of Melexis' 991 total products to 3,234 competing products. Much of the data collected had to be acquired manually, through direct datasheet review

of each comparable product, but major microelectronics distributors like Mouser Europe and LCSC helped expedite the process.

The results of the study reveal that Melexis controls automotive magnetic position sensor production, along with 3-axis latch & switch sensor production. Its small market is inconsequential to larger competitors, which explains why Melexis maintains stable, cross-cycle ROE and ROCE more than twice its peer average.

Melexis also outperforms peer averages in core regional markets, and has grown its sensors per car above the rate of integrated circuit (IC) growth per car since 2012. As the business continues to strengthen its position in core product markets, long-term supplier and customer agreements, along with "allocation" practices, have provided Melexis with best-in-class inventory management and economic stability. Moreover, Melexis is in excellent financial condition, with a debt-to-equity ratio of 37.6%, and EBIT-to-Interest of 15.1 times. A bonus is that 100% of the company's debt is unsecured, and 56% of it is not due until between 2029 and 2032.

Aside from Melexis' operational excellence, the business is owner-operated, and is benefitting disproportionately from automotive electrification, as high-end battery electric vehicles (BEVs) and plug-in hybrid vehicles (PHEVs) contain between 50% to 70% more sensors than same-class vehicles with internal combustion engines (ICEVs).

The automotive sensor industry is currently in a downturn as it works through excess inventory built post-pandemic, for which recovery time may be exacerbated by the imposition of US tariffs on Europe and Asia. Regardless of short to medium-term uncertainty, long-term growth drivers remain intact, which presents investors with an opportunity to purchase shares in Melexis at a fraction of its historical valuation.

In fact, at 10.85x EV/EBIT, Melexis is trading in its 15th percentile of historical valuation—adjusted for dot-com and GFC distortions—and its price is the same as it was *ten years ago*, despite demonstrable improvements in sales, earnings per share, and competitiveness.

Government-led decarbonization efforts in Europe and Asia will continue to inspire long-term demand for automotive magnetic sensors, along with improvements in vehicle safety and in-cabin comfort. An added cherry is Melexis' immaterial exposure to US markets, which offers investors a degree of tariff insulation.

MELEXIS

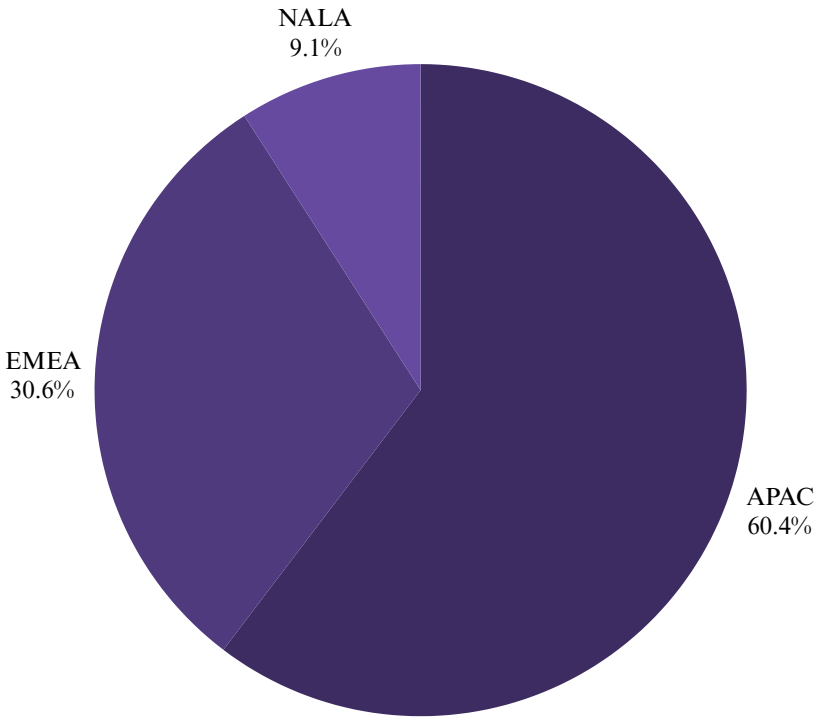
A Meccah In-Wait

Melexis was founded in Ypres, Belgium, by Roland Duchâtelet, Françoise Chombar, and Rudi Dewinter in 1988, who remain in business together today. Françoise serves as the company's chairwoman, Roland as a company director, and Rudi as the CEO of X-Fab: Melexis' primary wafer supplier.

Collectively, Françoise and Roland own 50% of the company, with Françoise owning 25% through her family office, Sensinnovat bvba, and Roland owning 25% through his family office, Elex N.V.

Melexis' largest regional market is Asia, followed by Europe and North America, with Hong Kong, Germany, and China comprising 14.7%, 12.6%, and 12.55% of 2024 sales, respectively.

Melexis Consolidated Sales FY2024



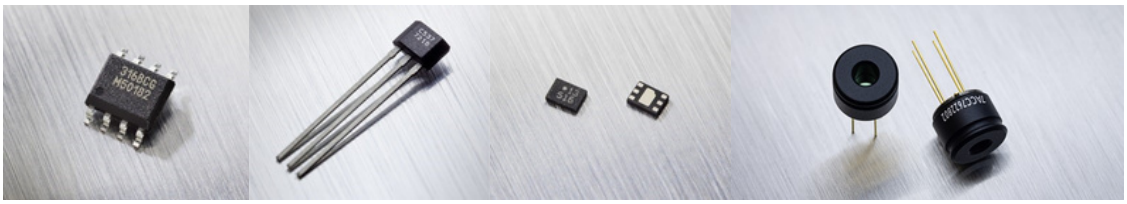
Melexis operates thirty-three facilities worldwide, with eight manufacturing locations, thirteen sales and applications locations, and twelve research and development facilities. All of the company's owned manufacturing facilities are

based in Europe, aside from one newly opened testing facility in Kuching, Malaysia.

What Are Melexis' Products, and What Do They Do?

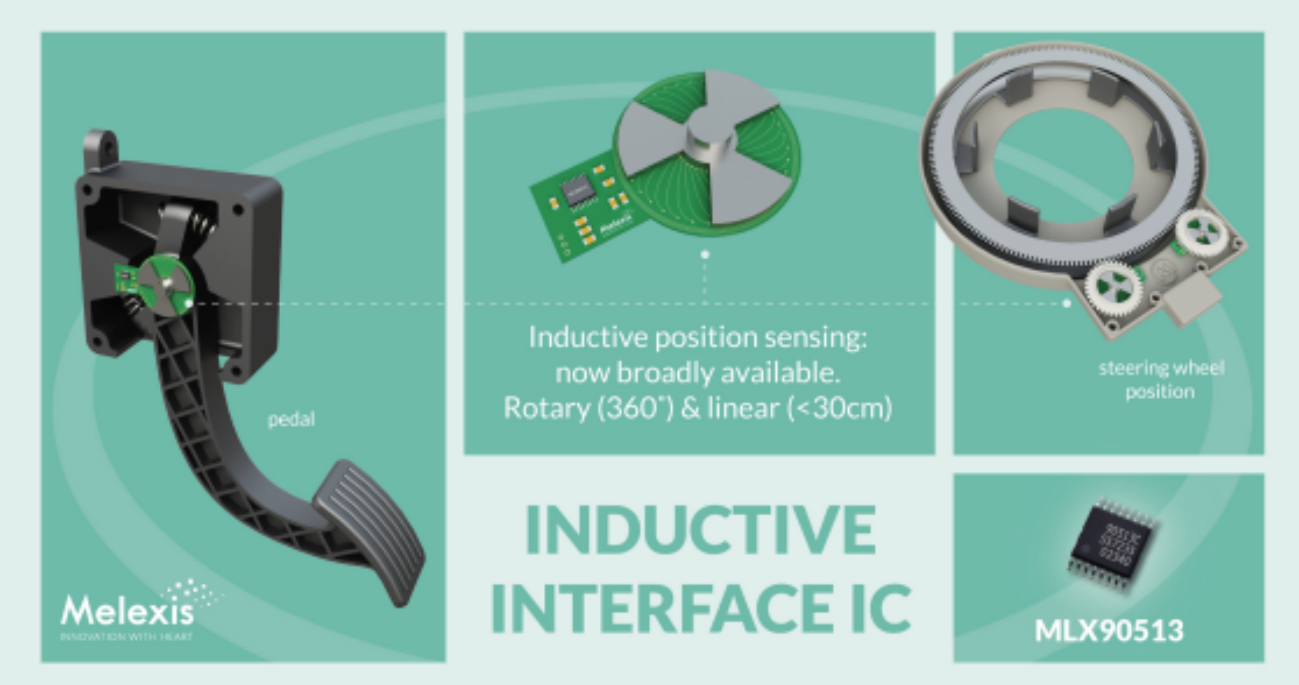
While Melexis' technological nature may intimidate some readers, the company's sensors are easy to understand, and are crucially intertwined in our lives.

Examples of Melexis Sensors



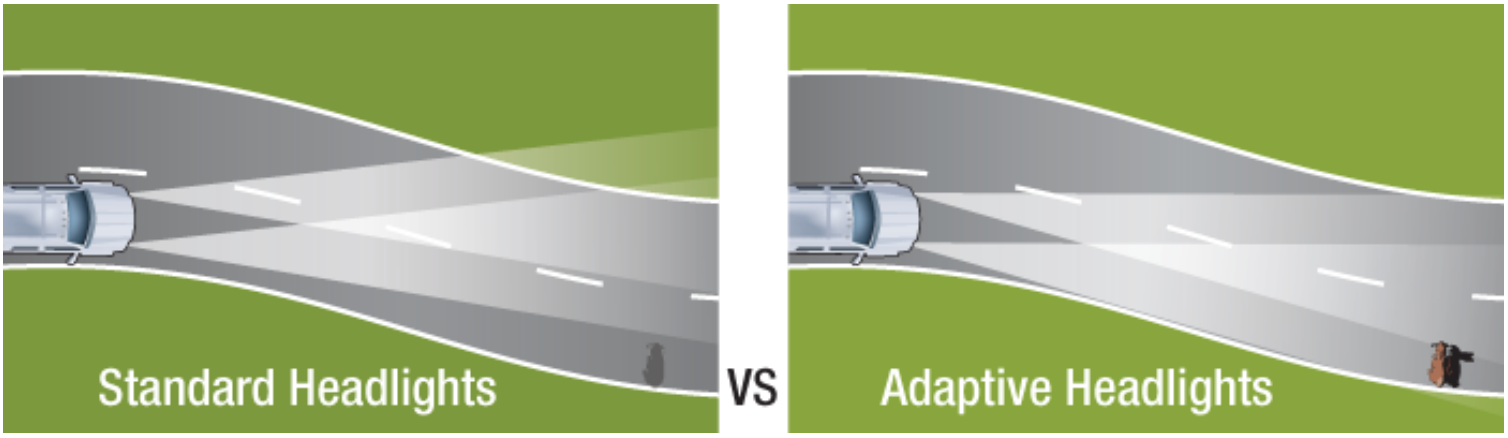
Simply, an automotive analog sensor takes an analog signal, like temperature, motion, position, or speed, and converts it into a digital signal that is sent to an electronic control unit (ECU). The ECU uses the information provided to perform an action, or to provide an operator with pertinent information, if certain programmed conditions are met.

Example #1: A magnetic analog sensor designed to measure the position of objects is placed in a vehicle's brake pedal. While the vehicle is in motion, the operator suddenly presses hard on the vehicle's brake pedal (analog action). The sensor detects the sudden and strong shift in the pedal's position, and sends a digital signal to an ECU to trigger the vehicle's anti-lock braking system.



Source: Melexis 2023 Annual Report

Example #2: A common feature of mid and high-end vehicles are adaptive headlights. These headlights shift their position based on analog information gathered by the position of a vehicle's steering wheel, which is detected by a magnetic position sensor. Once a certain angularity of a steering wheel is achieved, a "side-beam" will trigger, or a vehicle's headlights will shift position parallel to the steering wheel's movement. This increases occupant and pedestrian safety in conditions of low visibility.



Source: My Car Does What?

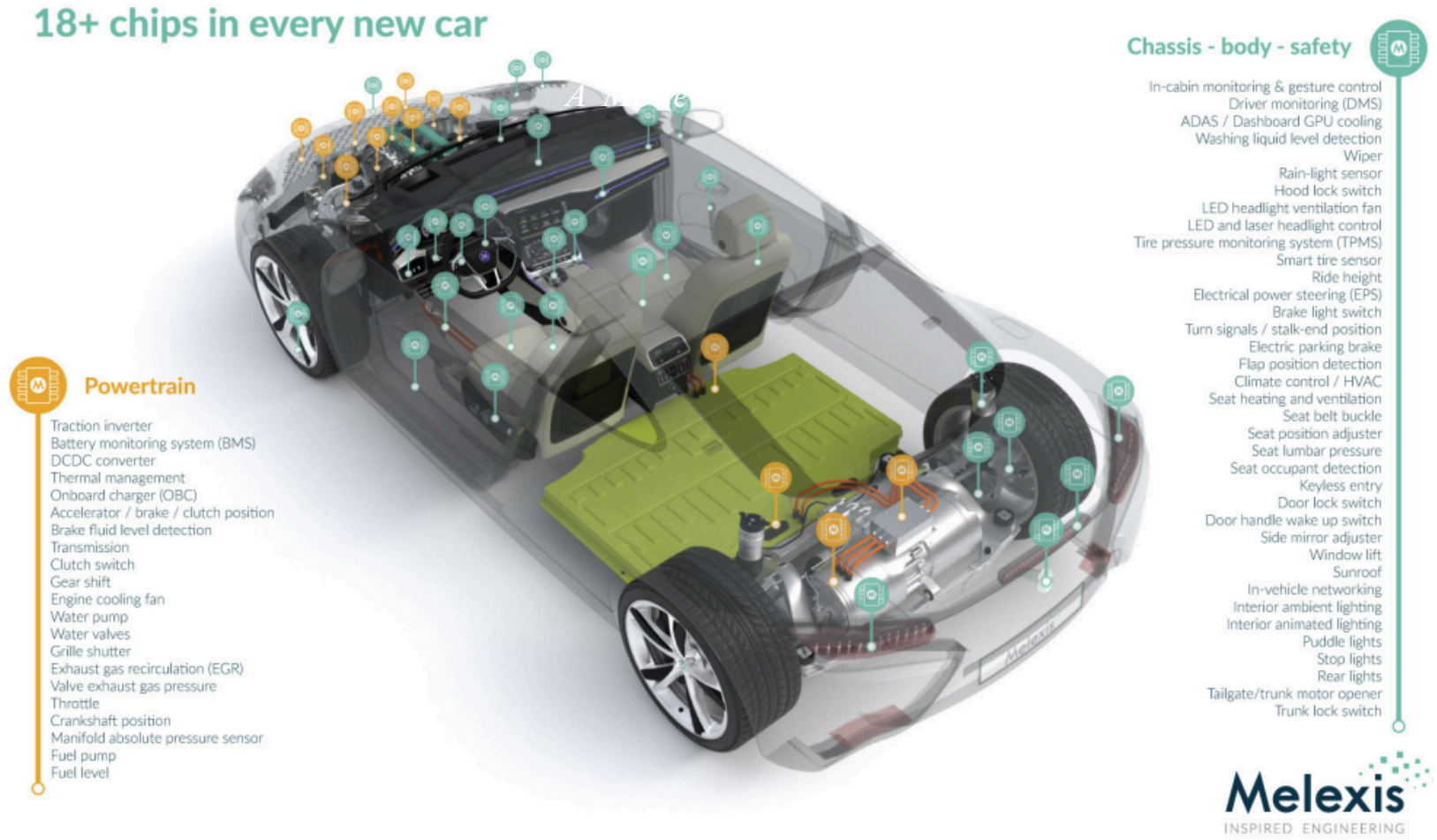
Conversely, a digital sensor takes a digital signal and turns it into an analog action.

Example: The operator of a vehicle sets its cabin heat to a certain temperature using the vehicle's digital touchscreen. A digital sensor detects the change, and sends a signal to turn on the vehicle's HVAC system to emit the set temperature (analog action).

Practically every aspect of a vehicle's functionality is assisted or actuated by an analog or digital sensor, and their use has steadily increased over time with trends in advanced driver assistance (ADAS), electrification, and the general premiumization of vehicles.

They provide vehicle operators with important information about a vehicle’s status, like its tire pressure, gear position, speed, fuel level, and engine function. They direct the operation of comfort features, like cabin lighting, seat position, and fan operation, and they facilitate the engagement of safety features, like airbag deployment, autonomous breaking, lane alignment, and vehicle height adjustment.

On average, every new vehicle produced contains <u>at least 18</u> of Melexis' sensors

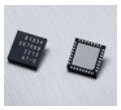


Source: Melexis 2023 Annual Report

Melexis is Focused

On Melexis' website, an investor may be led to believe that the company generates its revenue from a diverse array of products, with thirteen categories of ICs offered.

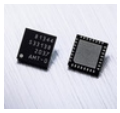

Current Sensors ICs


Embedded Motor Driver ICs


Smart LED Driver ICs


Inductive Position Sensor ICs


Latch & Switch ICs


Pre-Driver ICs


Magnetic Position Sensor ICs


Optical Sensor ICs


Temperature Sensor ICs


Pressure Sensor ICs

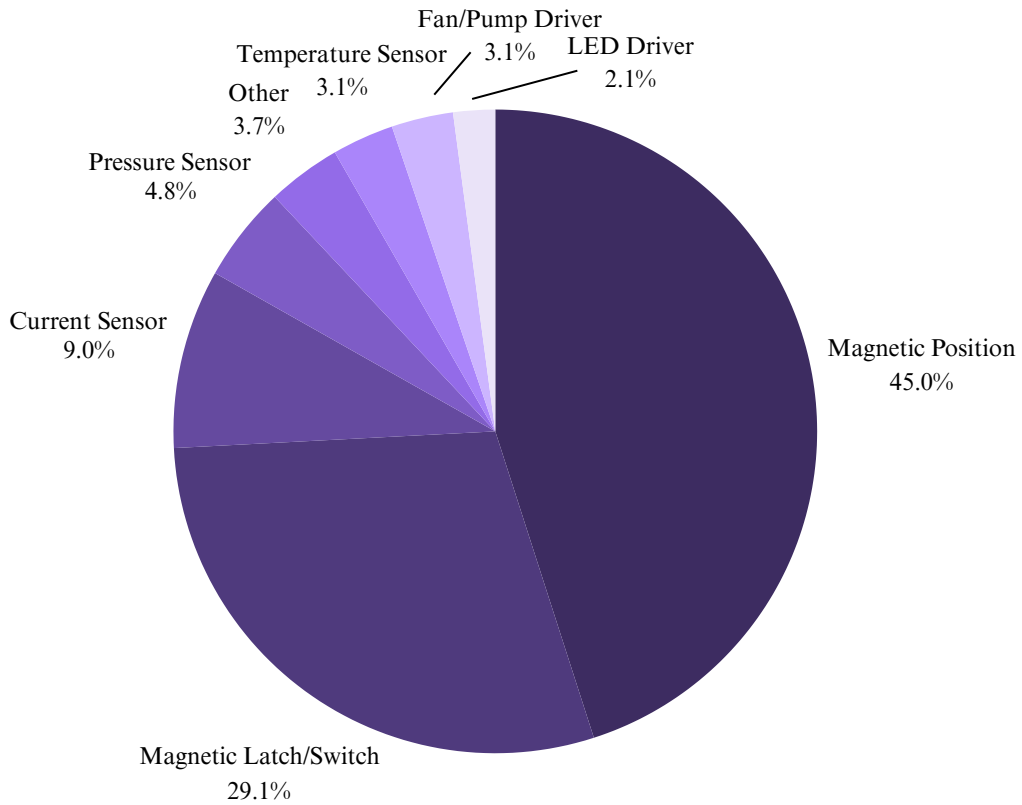

Speed Sensor ICs


Transceiver ICs


Fan & Pump Driver ICs

In reality, Melexis is hyper-focused. Magnetic position, latch & switch, current, and pressure sensors account for 87.9% of all Melexis products.

Melexis Product Line % of Total



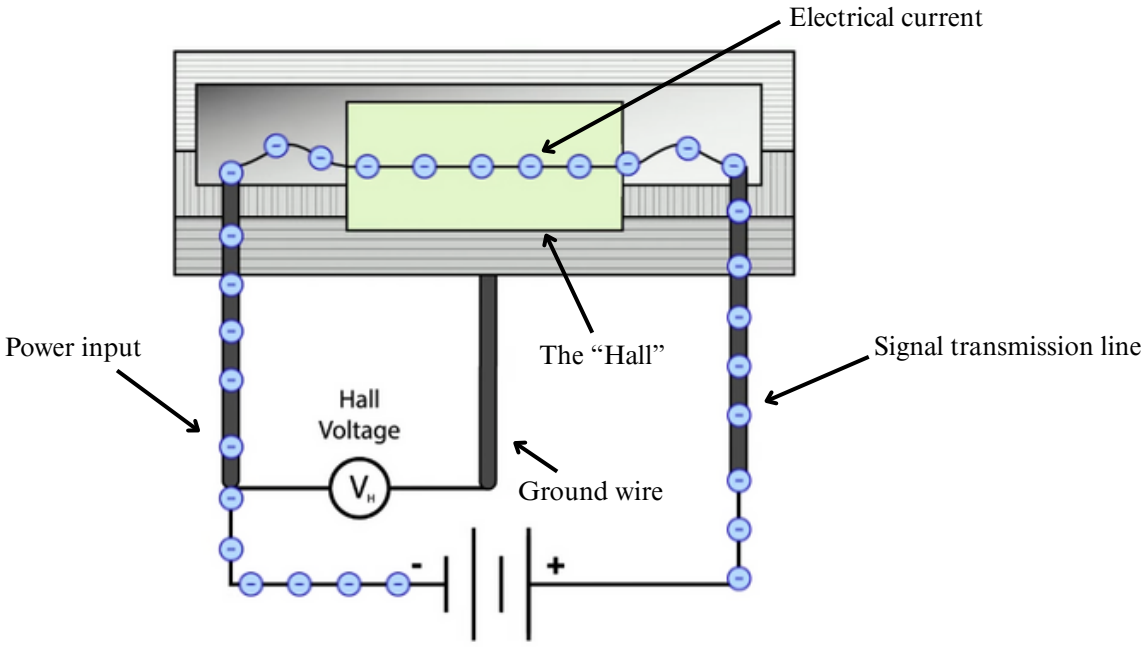
Overview of Magnetic Position Sensors

Although examples of the utility of magnetic position sensors have been provided, it is important to understand their technology.

A magnetic position sensor works by measuring the position or movement of an object by sensing changes in its magnetic field.

When a vehicle is turned on, an electrical current passes through a magnetic position sensor. As the current flows through, it generates a magnetic field around the sensor.

Example of a "hall effect" magnetic sensor

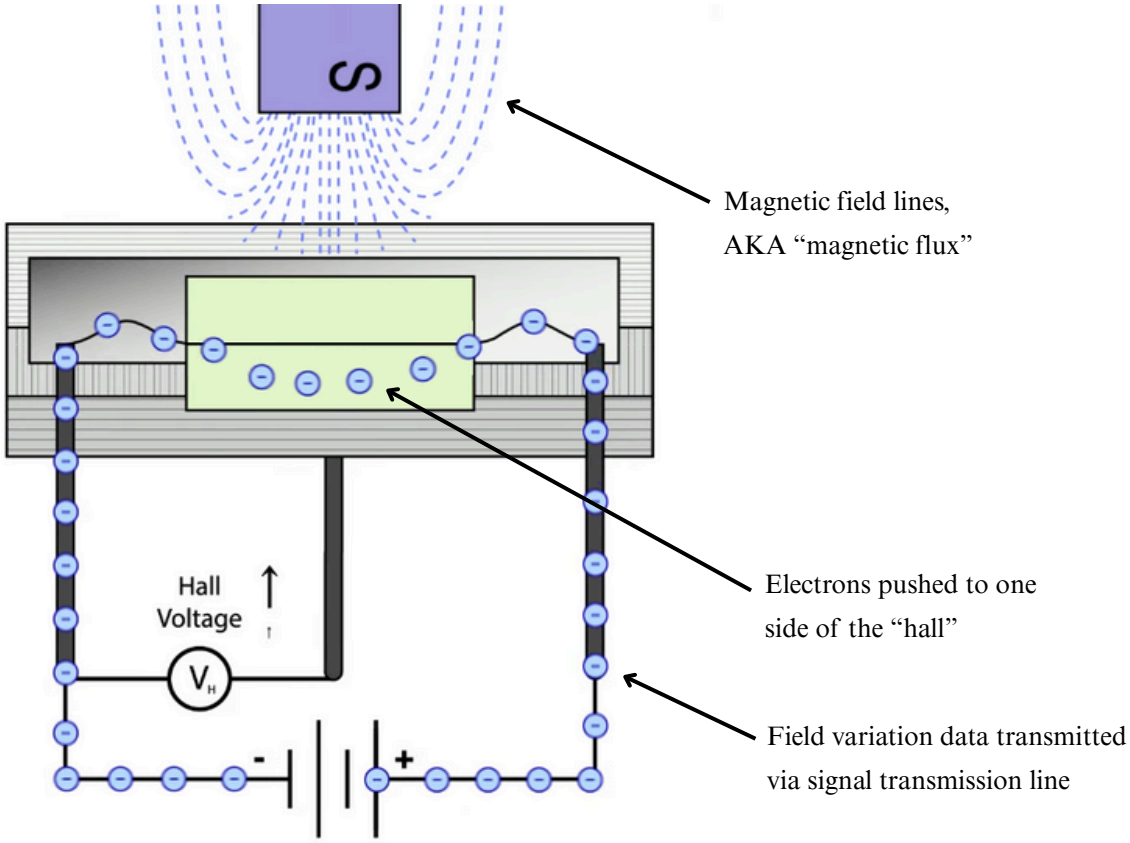


Source: Element14

Magnets also have magnetic fields. As a result, if a magnet is positioned on an object in relation to a magnetic position sensor, shifts in the movement of that object will interfere with the sensor's magnetic field.

The interference pushes more electrons to one side of the magnetic position sensor

than the other. Variance in electron concentration is detected by the position sensor, which it uses to measure the position of objects with magnets attached to them.

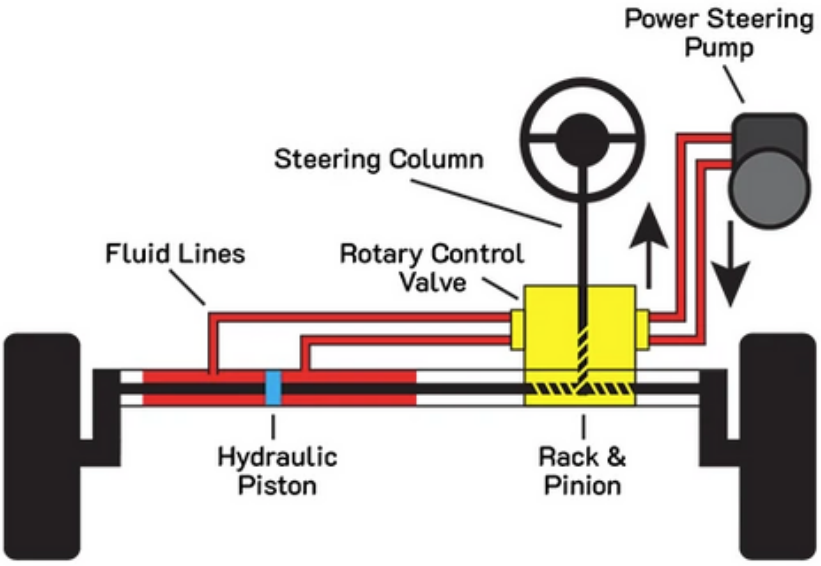


Source: Element14

Steer-by-wire technology provides a helpful visualization for the aforementioned mechanics, as it uses magnetic position sensors to direct the turning radius of a vehicle.

In power steering and traditional steering mechanics, the wheels of a vehicle are turned mechanically through a steering column that is attached to the vehicle’s rack.

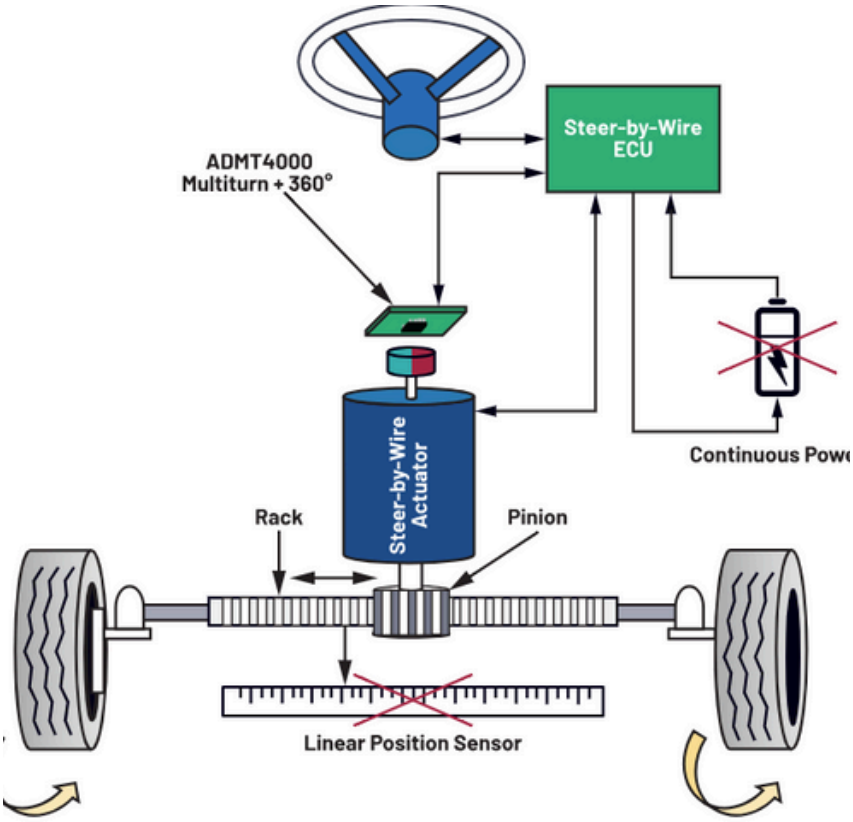
Diagram of a Power Steering System



Source: Borst Automotive

In steer-by-wire, there is no physical connection between a steering wheel and a vehicle's rack. Instead, a magnetic position sensor is attached to the base of a steering wheel, which faces an actuator with a magnet attached to it. When the steering wheel is moved, the attached magnet interacts with the position sensor's magnetic field. The sensor sends the positional information to an ECU, which causes the vehicle to move proportional to the movement of the steering wheel.

Diagram of a Steer-by-Wire System



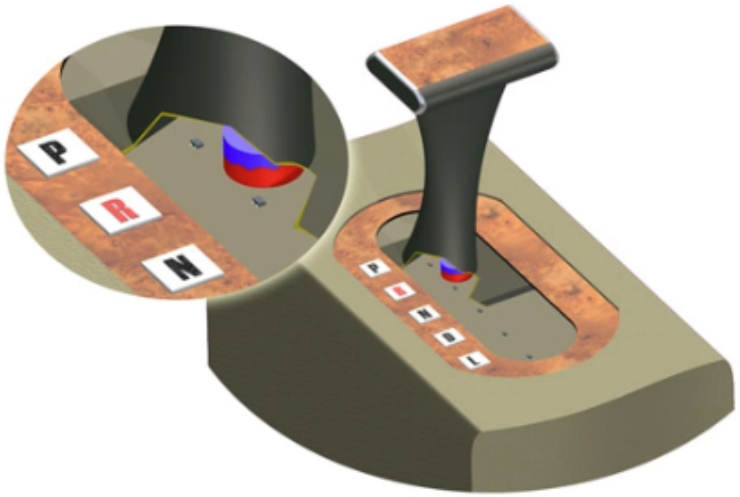
Source: ADI Analogue Dialogue

Although seemingly more complex, steer-by-wire systems offer notable safety improvements over traditional mechanical steering systems, as meaningful redundancy can be created by using multiple magnetic sensors, control units, and steering actuators to prevent failure. The result is that even if steering fails in multiple wheels, the torque from a single wheel can be evenly distributed to prevent a steer-by-wire system from failing.

Overview of Magnetic Latch & Switch Sensors

The typical applications of magnetic latch & switch sensors are simple, like buttons, nobs, windshield wipers, fans, and hinges. In this sense, magnetic latch & switch sensors may be thought of as having an “off” or “on” characteristic, as the presence, absence, or intensity of a magnetic field corresponds with an absolute action. This makes them dissimilar to position sensors that constantly transmit data related to variable shifts in a magnetic field.

Latch & switch sensors are either unipolar or omnipolar. A unipolar switch only activates in the presence of one pole (north or south), and it deactivates when that pole is absent. Unipolar switches are common in automatic gear shifters, where moving the gear shifter south will correspond with a vehicle being put into gear (magnetic field is present), and north will switch the selected gear off (magnetic field is absent).



Source: Allegro Microsystems

By contrast, an omnipolar switch activates in the presence of both a magnet's north and south pole, with the action performed dependent on which pole is present. For instance, omnipolar magnetic switches are commonly used in automatic windows, where the analog action of pressing a window button "down" or "up" corresponds with the direction that the window moves, based on whether a magnet's north or south pole is present.

Examples of Omnipolar Latch & Switch Applications

Source: Melexis

Why Melexis is Frequently Misunderstood: Product Analysis as a Method to Acquire Owner-Like Understanding

The standard of modern finance is to quote disclosed company and competitor market share as trustworthy comparables. After all, why should investors distrust disclosed market information that should be verifiable?

Unfortunately, common definitions of "total addressable market share" or "serviceable addressable market share" are prone to inaccuracies via discretionary bias, conflation, and cherry-picking. Unless a collection of companies all produce precisely the same product (e.g. navel oranges) in precisely the same locale(s), the simple citation of serviceable or total addressable market share is likely to ignore important nuances about a company's competitive position.

For example, Maiden's report on Palfinger estimates the company's share of the knuckle boom crane industry to be 35%. However, analyzing the specifications of competing products reveals that Palfinger and its primary competitor, Hiab, lead different sub-segments of the market.

Palfinger is the clear leader in the production of heavy-duty knuckle boom cranes, while Hiab is the clear leader in medium-duty knuckle boom cranes. Hence, assessment of Palfinger and Hiab's core product market share would likely produce higher respective percentages, and derive more meaningful competitive insight, than a broad-market comparison.

For the reasons mentioned, Melexis' competitiveness in magnetic position and latch & switch sensors is frequently understated—often grossly so—in communications published by competitors, and even by Melexis itself.

Competitor reporting measures Melexis' automotive sensor revenue against the automotive sensor market at-large, which disaffirms the company's specialization. This, despite the fact that there are *twenty-seven different categories* of analog sensor that all measure *different* environmental phenomena.

To verify suspicions that Melexis' market position is unfairly represented by status quo disclosures of sensor market share, a product analysis was conducted that included the comparative analysis of 871 of Melexis' 991 total products, versus 3,234 competing products. Thanks to their large share of total products, the study emphasized analysis of Melexis' magnetic position and latch & switch sensors, with moderate attention paid to the company's current and pressure sensors. A combination of manual, one-on-one comparison and distributor inventory analysis on Mouser Europe and LCSC Asia was utilized to distinguish differences in product catalogue size and technical specifications.

The study not only revealed Melexis to dominate the magnetic position sensor market on the basis of catalogue size and technical ability, but distributor product share and regional disparities strongly suggest that Melexis also leads in automotive magnetic latch & switch sensors in Europe and Asia.

Notably, of Melexis' eleven named competitors, Texas Instruments, Allegro Microsystems, and Infineon were the only companies identified as having material overlap in magnetic latch & switch and position sensors in Melexis' core regional markets. As such, the majority of product comparisons centered on these three incumbents.

Summary of Findings

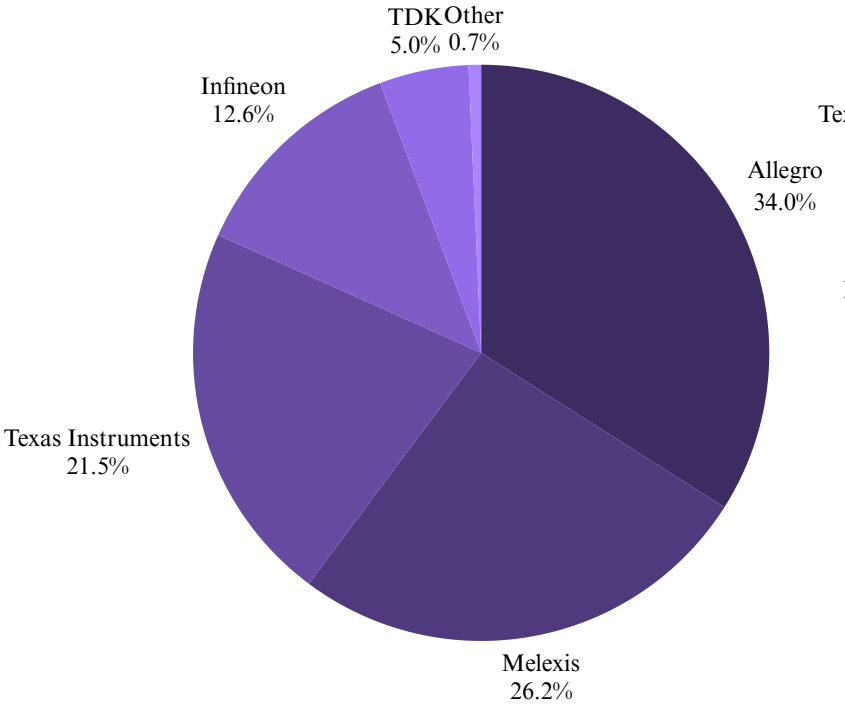
Magnetic Latch & Switch Sensors

On Mouser Europe, Melexis ranks first in magnetic latch & switch sensor ICs, with 41.2% of active listed products, versus 32% for Allegro Microsystems, 8.1% for Infineon, and 7% for Texas Instruments. The four companies combined accounted for 88% of magnetic latch & switch sensor ICs produced by named competitors.

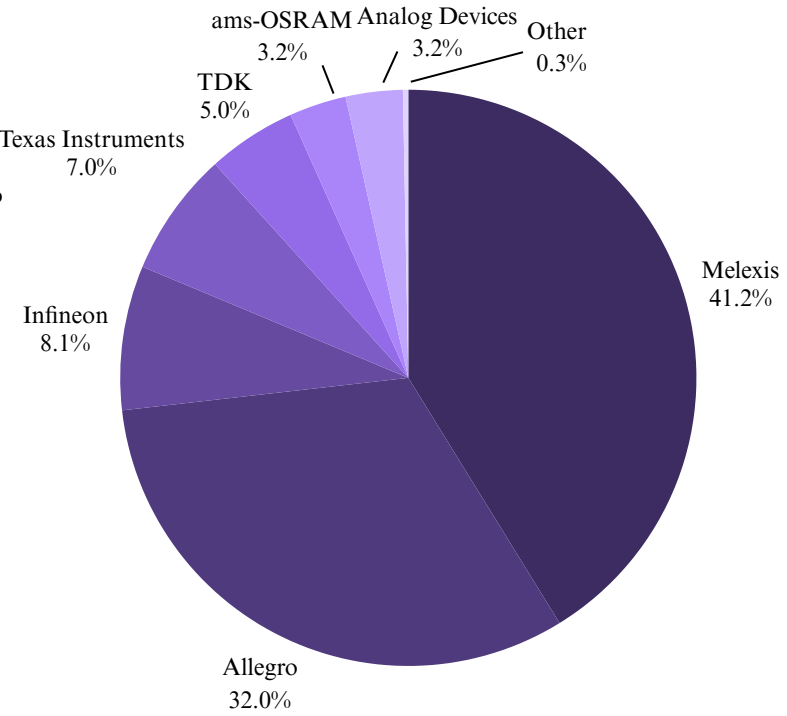
Comparatively, product inventory analysis on LCSC ranks Melexis second in magnetic latch & switch sensors, with 26.2% of listed products, versus Allegro's 34%. But, technological differences between Melexis' and Allegro's latch & switch sensors segregate the two company's end markets, while Texas Instruments' lack of three-axis magnetic latch & switch sensors similarly denigrates their competitive relevancy.

Furthermore, a large portion of Texas Instruments' datasheets on LCSC are written in Chinese, with translation limited due to research time constraints. Importantly, 58.4% of Texas Instruments' 355 magnetic latch & switch sensors on Mouser Europe were individually confirmed as unsuitable for automotive applications, while no distinction was made for Texas' LCSC-listed products. Thus, it is probable that a similar majority of non-automotive products comprise Texas' LCSC listings, which understates Melexis' share of LCSC inventory.

LCSC: Latch & Switch Sensor ICs



Mouser Europe: Latch & Switch Sensor ICs

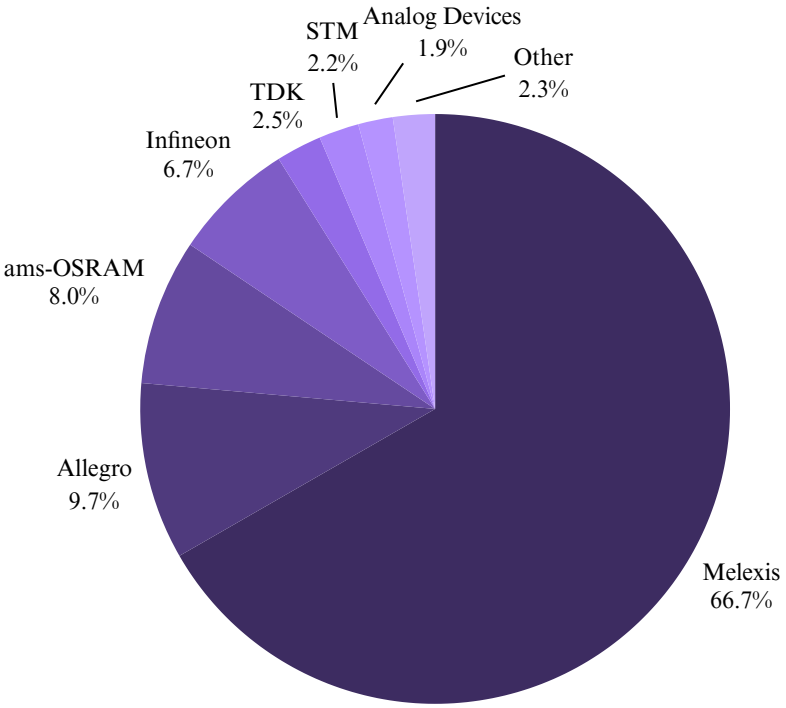


Magnetic Position Sensors

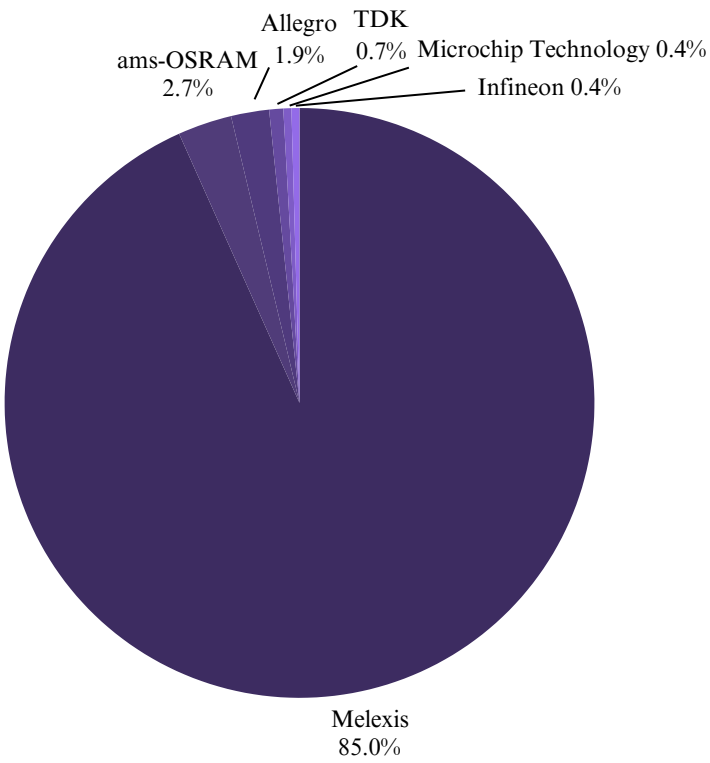
Analysis of magnetic position sensors on both Mouser Europe and LCSC revealed Melexis to be the clear industry leader, with no meaningful secondary competitor identified. The significance of the finding was bolstered by the fact that magnetic position sensors account for 45% of all of Melexis' products.

On LCSC, Melexis' magnetic position sensors comprise 66.7% of listed magnetic position sensors. The next largest share goes to Allegro Microsystems, with 9.7% of listed products. On Mouser Europe, Melexis is responsible for no less than 85% of all listed magnetic position sensors, including unnamed competitors. No other named competitor held a material share of inventory.

LCSC: Position Sensor ICs



Mouser Europe: Position Sensor ICs

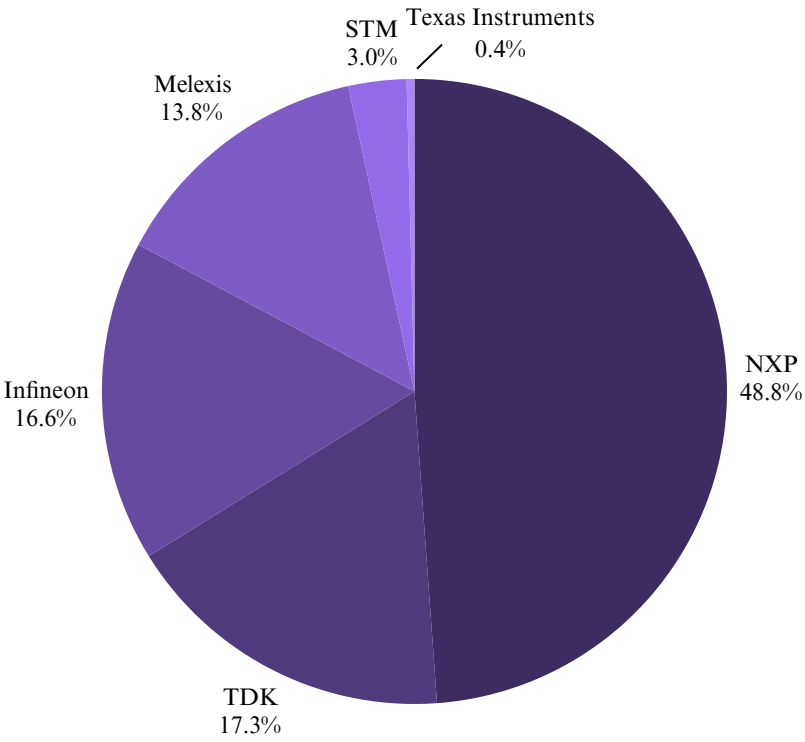


Pressure and Current Sensors

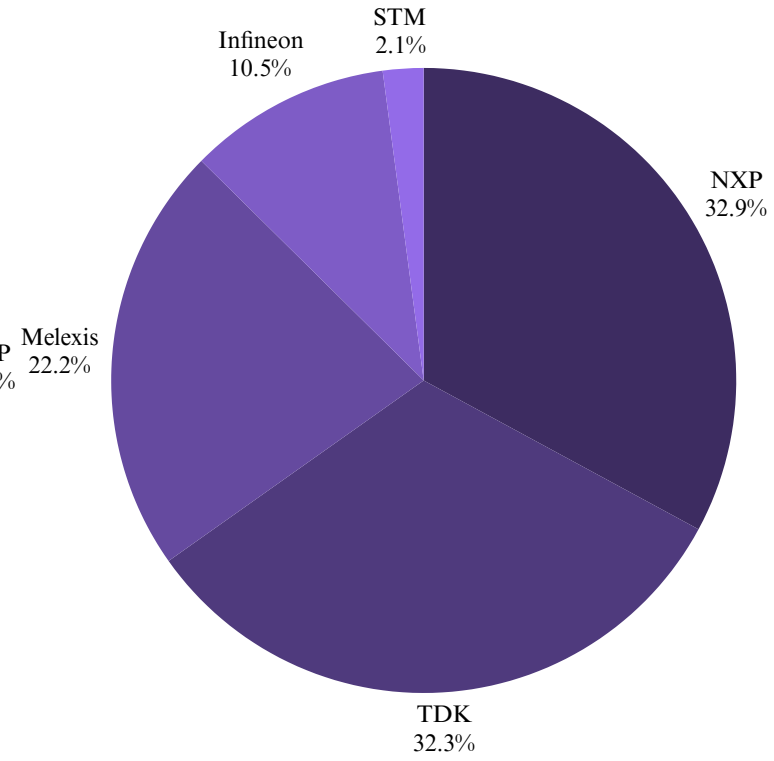
Melexis' competitive share is less significant in pressure sensors, with the company ranking fourth on LCSC, with 13.8% of products offered, and third on Mouser Europe, with 22.2% of products offered.

Competitiveness picks up in current sensors, Melexis' third largest product category, as the company ranks second on both Mouser Europe and LCSC, representing 25.9% and 37% of listed products, respectively.

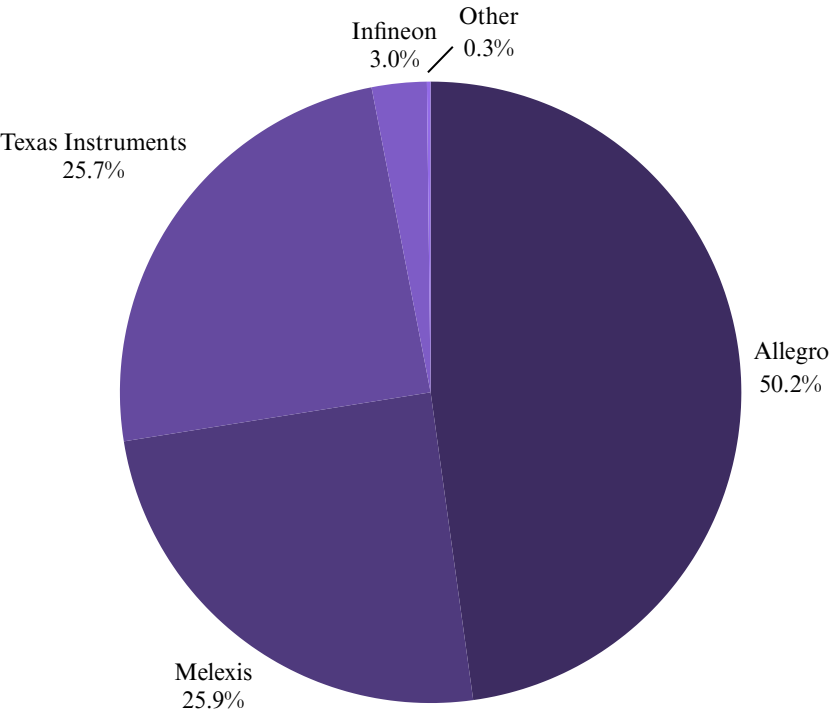
LCSC: Pressure Sensor ICs



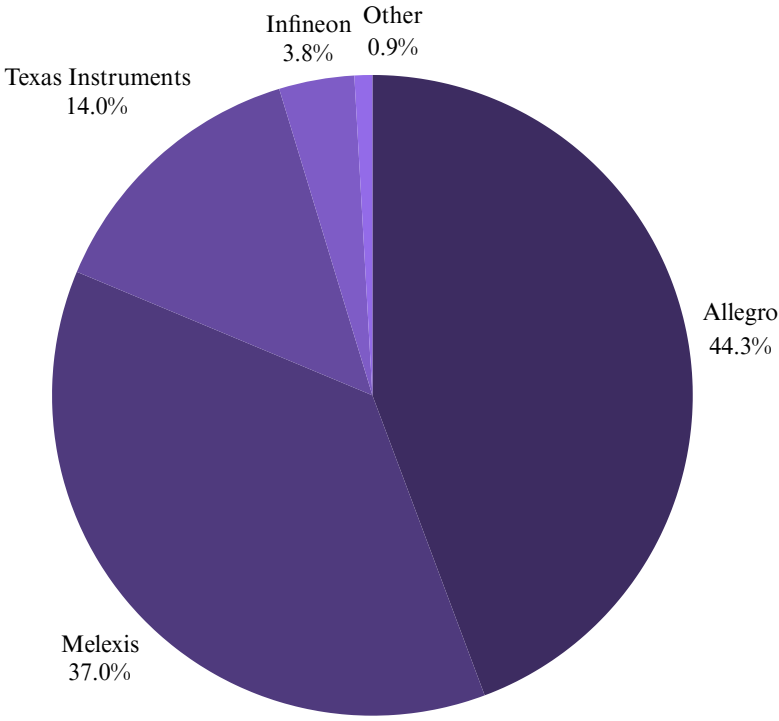
Mouser EU: Pressure Sensor ICs



Mouser EU: Current Sensor ICs



LCSC: Current Sensor ICs



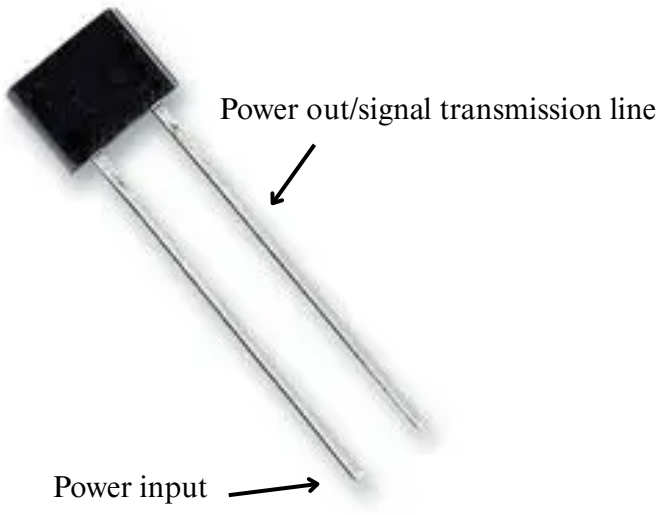
Detailing Melexis' Sophistication

Among featured magnetic latch & switch sensors on Mouser Europe, comparison of Melexis' offerings revealed a boarder mix of magnetic sensors with higher accuracy and sensing ability over Allegro Microsystems and Texas Instruments.

Magnetic sensors are commonly constructed with two, three, or four wires attached to their base. In a two-wire magnetic sensor, the wire that powers the sensor shares the same output line as the transmission signal. While simple and inexpensive in design, any fluctuations in the power supply can disrupt signal integrity, which makes them less responsive and less accurate.

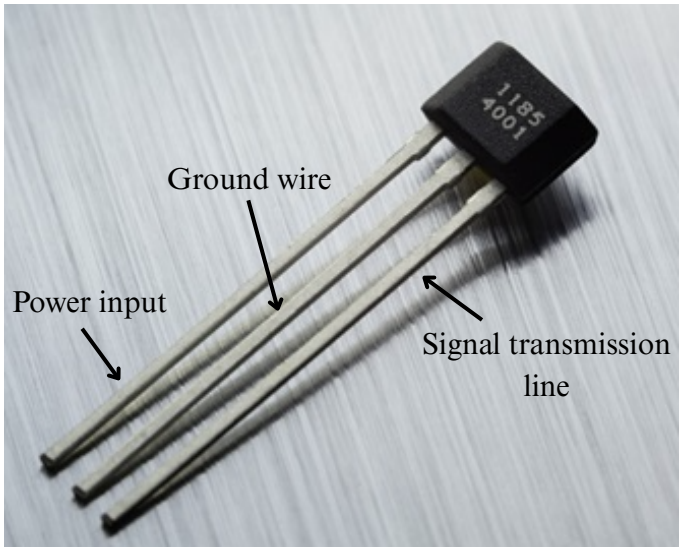
Conversely, a three-wire magnetic sensor separates the power input and output lines from the signal transmission line, which removes the potential for interference and increases signal accuracy and responsiveness. Although more complex and more expensive, increased reliability and responsiveness makes them ideal for use in mid and high-end vehicles.

Two-Wire Sensor



Source: Farnell

Three-Wire Sensor



Source: Melexis

It happens that Melexis is *the* go-to for three-wire automotive magnetic latch & switch sensors, with 93% of listed three-wire latch & switch sensors on Mouser Europe produced by Melexis.

Melexis also leads in three-axis magnetic latch & switch sensors, claiming 75.6% of listed automotive three-axis sensors on Mouser Europe, and 75% on LCSC.

Two-axis sensors comprise the bulk of Allegro's and Texas Instruments' magnetic latch & switch offering. Unlike a two-axis sensor, a three-axis sensor can measure the presence of a magnetic field on three axes—X, Y, and Z—making them flexible for multi-function use, as they can sense and measure the strength of a magnetic field in three-dimensions, while a two-axis sensor can only sense a magnetic field on a two-dimensional plane.

To provide an example, the height of a vehicle does not exist on a two-dimensional plane while in motion: Road quality, wind, and steering wheel position all impact a vehicle's height across multiple axes. A three-axis sensor, like Melexis' MLX90426 three-axis position sensor, works to collect data on the distance between a vehicle's suspension and the road, and sends it to an engine control unit to adjust the vehicle's suspension to maintain ride stability.

Indeed, the applications for three-axis sensors are frequently critical in nature, and require a high level of reliability and accuracy to function properly. Melexis sells these sensors under their "Triaxis" brand, and have sold over one billion since the technology's launch in 2005.

Regarding current sensors, time constraints limited unit-level analysis, but broad observations imply that Melexis' current sensors may have a higher operating temperature range over offerings from Allegro and Texas Instruments. On LCSC, Melexis offers current sensors with –40C to +150C operating capability, versus

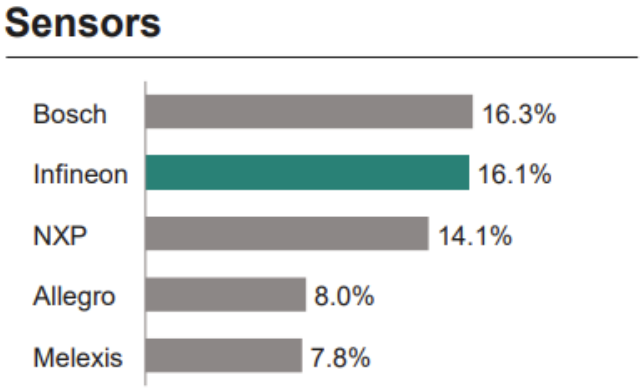
–40C to +85C operating capability for Allegro, and –40C to +125C for Texas Instruments.

Melexis' current sensors also showed the highest measurement capability relative to Allegro and Texas Instruments. According to LCSC, Texas' current sensors can measure up to a maximum of 45 amps of electrical current, while Allegro's can measure up to 400 amps, and Melexis' up to 2,000 amps.

Discussion

With Melexis' competitiveness in magnetic latch & switch and position sensors verified, explanation for sustained economic outperformance is provided, as the next section details. Crucially, the product analysis also made assessing the relevancy of competitor disclosures of market share possible.

In Infineon's FY2023 investor presentation, the company claimed to hold the second highest share of the global sensor market, with 16.1%, while it ranked Melexis 5th with 7.8%. The irony of the citation is that Infineon maintains de minimis overlap with Melexis in core product categories, including current and pressure sensors. Given a lack of evidence for active engagement in Melexis' core markets, Infineon's ranking of Melexis is suspect, as it does not depict information that conveys meaningful competitive information.



Source: Infineon FY2023 Investor Presentation

At the same time, the size of Allegro Microsystem's product catalogue suggests that the company is Melexis' primary competitor for magnetic latch & switch sensors, but the technological differences discussed establish a premium/non-premium dichotomy.

"In some cases, customers are looking more for a middle of the fairway, a '**just good enough device**,' and that's really where we bring forward our quality record."
— Derek P. D'Antilio, CFO, Allegro Microsystems, 2025 Morgan Stanley Technology, Media, and Telecom Conference

Beyond product-level data and company communications, Allegro's low-end market focus is also affirmed by the company's lack of long-term agreements (LTAs) with customers and suppliers, and the absence of what is known as "allocation."

Post Covid-19, a chip shortage ensued, which included sensors. Thanks to Melexis being X-Fab's largest customer, the two companies signed an LTA to guarantee Melexis' wafer demand needs. As part of the agreement, 15% of the wafer cost was paid upfront for X-Fab to build additional capacity to meet Melexis' demand.

Thanks to the saliency of Melexis' products, the company also placed valuable customers into allocation throughout the supply crunch. Allocation is a term used by chip and semiconductor manufacturers to describe the rationing of chips to key customers when demand exceeds supply. The practice builds goodwill with choice customers, as allocation provides them with some semblance of volume assurance for essential chips.

Conversely, Allegro did not practice allocation during the chip shortage. This fact is important, as Melexis was able to use allocation to avoid the inventory whiplash that many of its competitors experienced in 2024.

While more work is needed to clarify the technical nuances of Melexis' current and pressure sensors, the company's number two ranking in current sensors on LCSC and Mouser Europe is not unsatisfactory. As the next section shows, comparison of Melexis' and Allegro's economics showcase material differences in regional sales and profitability, which undermines the significance of Allegro's share in automotive current sensors.

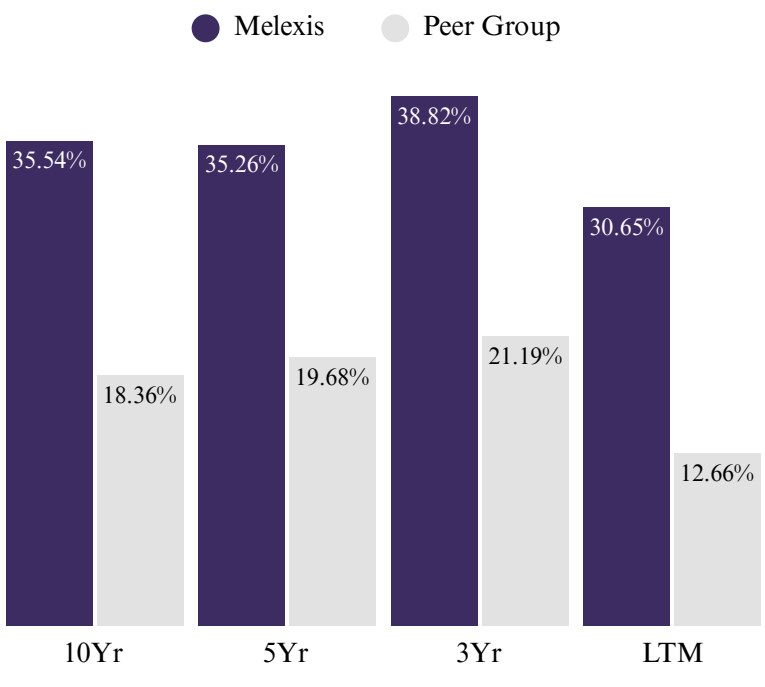
Regional and Consolidated Economic Disparities Bolster Melexis' Superiority

"We define sustainable competitive advantage as a company's ability to generate returns on investment above the cost of capital, and higher than its competitors, **for an extended period**."
— Michael J. Mauboussin and Dan Callahan: Understanding Competitive Advantage Through Market Power

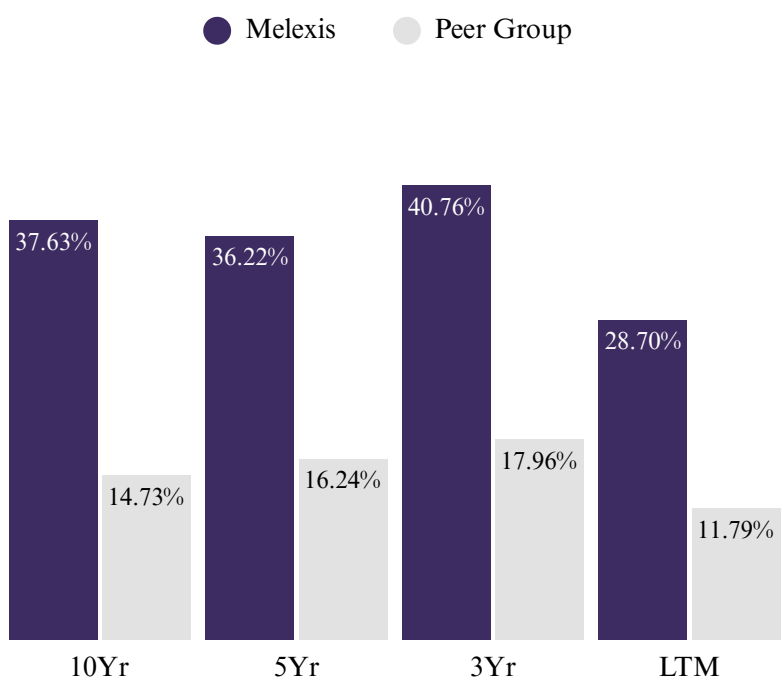
Key Economics

Over the past decade, Melexis has more than doubled peer group profitability and efficiency on an ROE and ROCE basis.

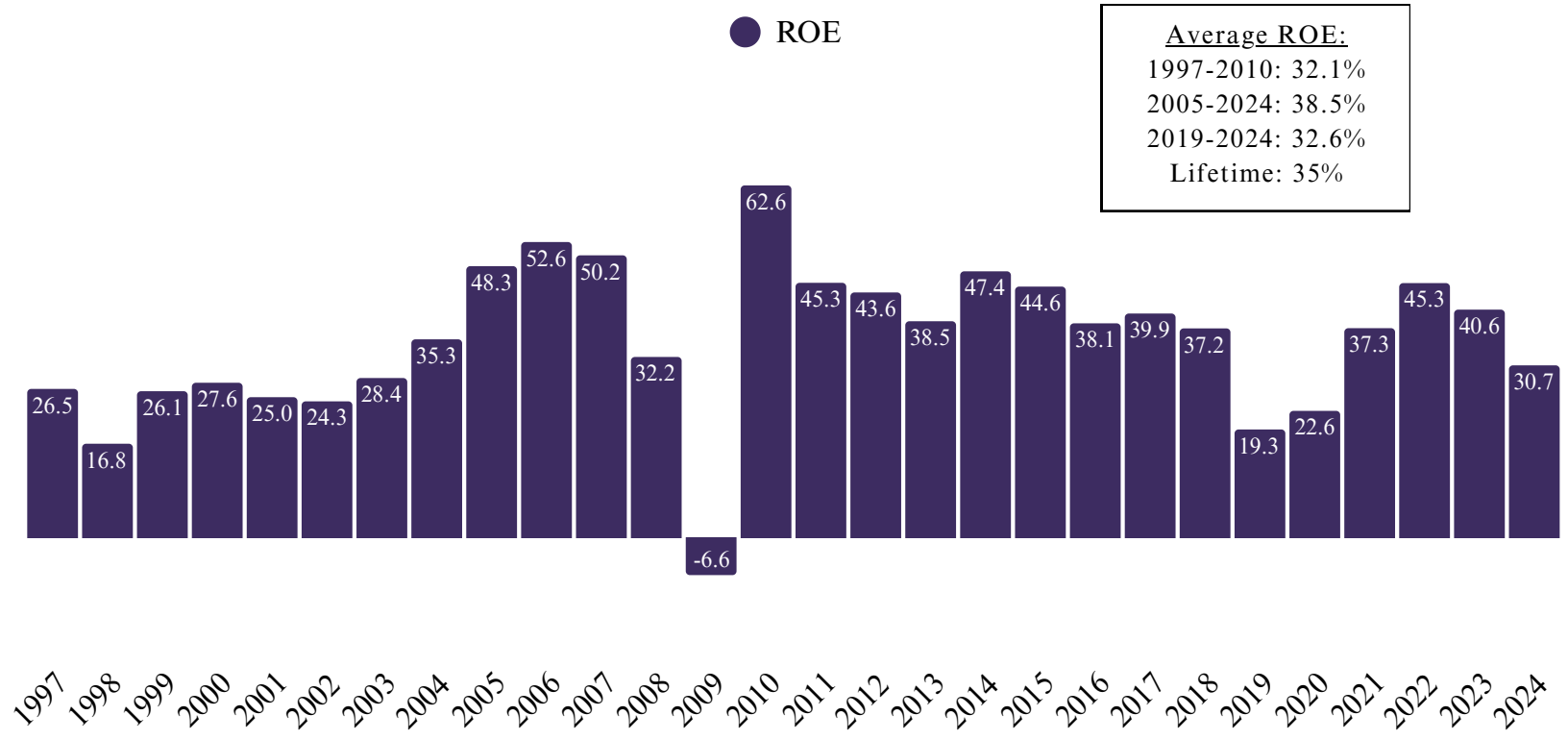
Historical Average ROE



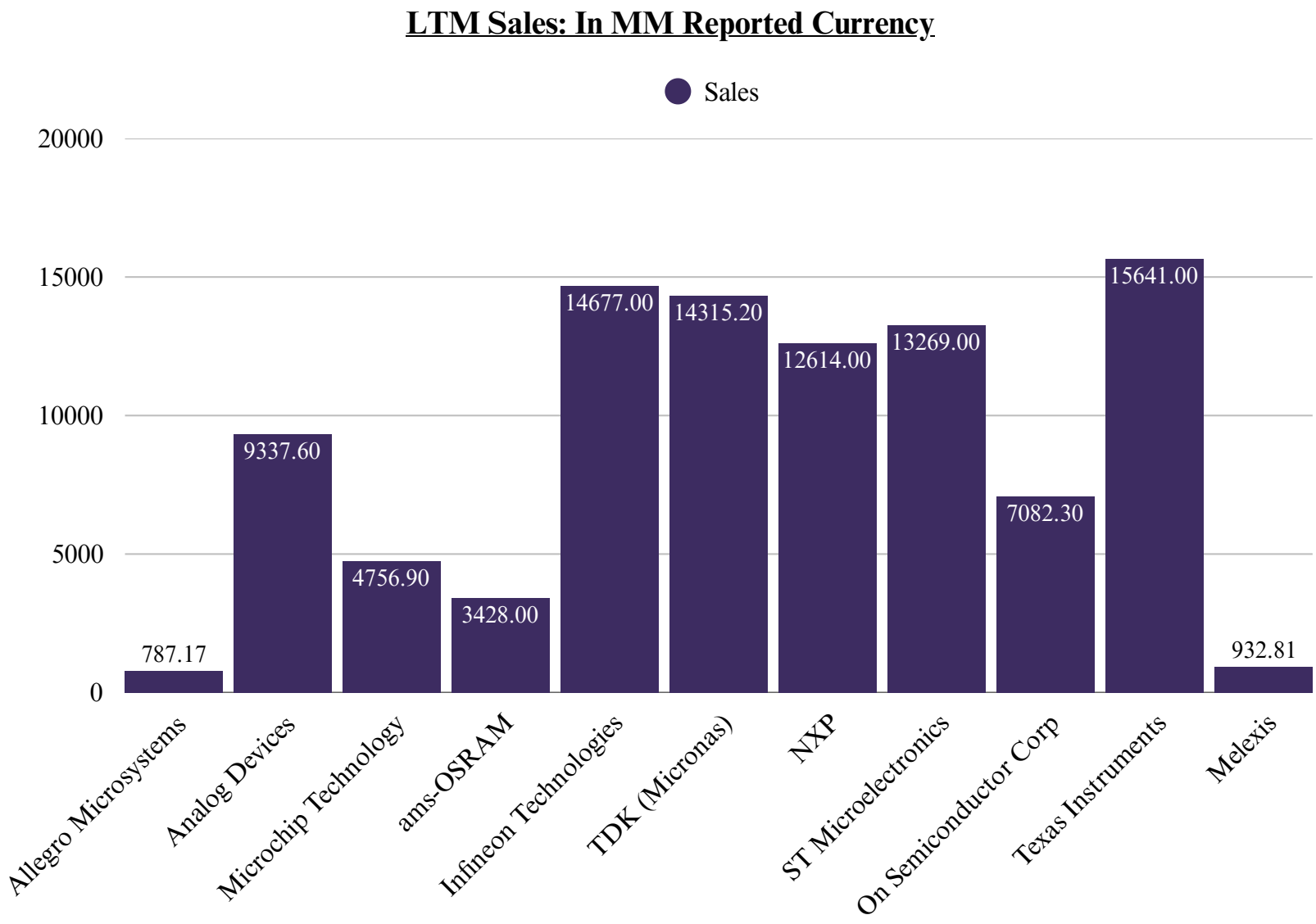
Historical Average ROCE



Melexis' business returns are not a new phenomenon. Consistency in ROE over time, particularly following the company's foray into three-axis sensors post-2005, has designated Melexis as one of Belgium's few long-standing compounders.

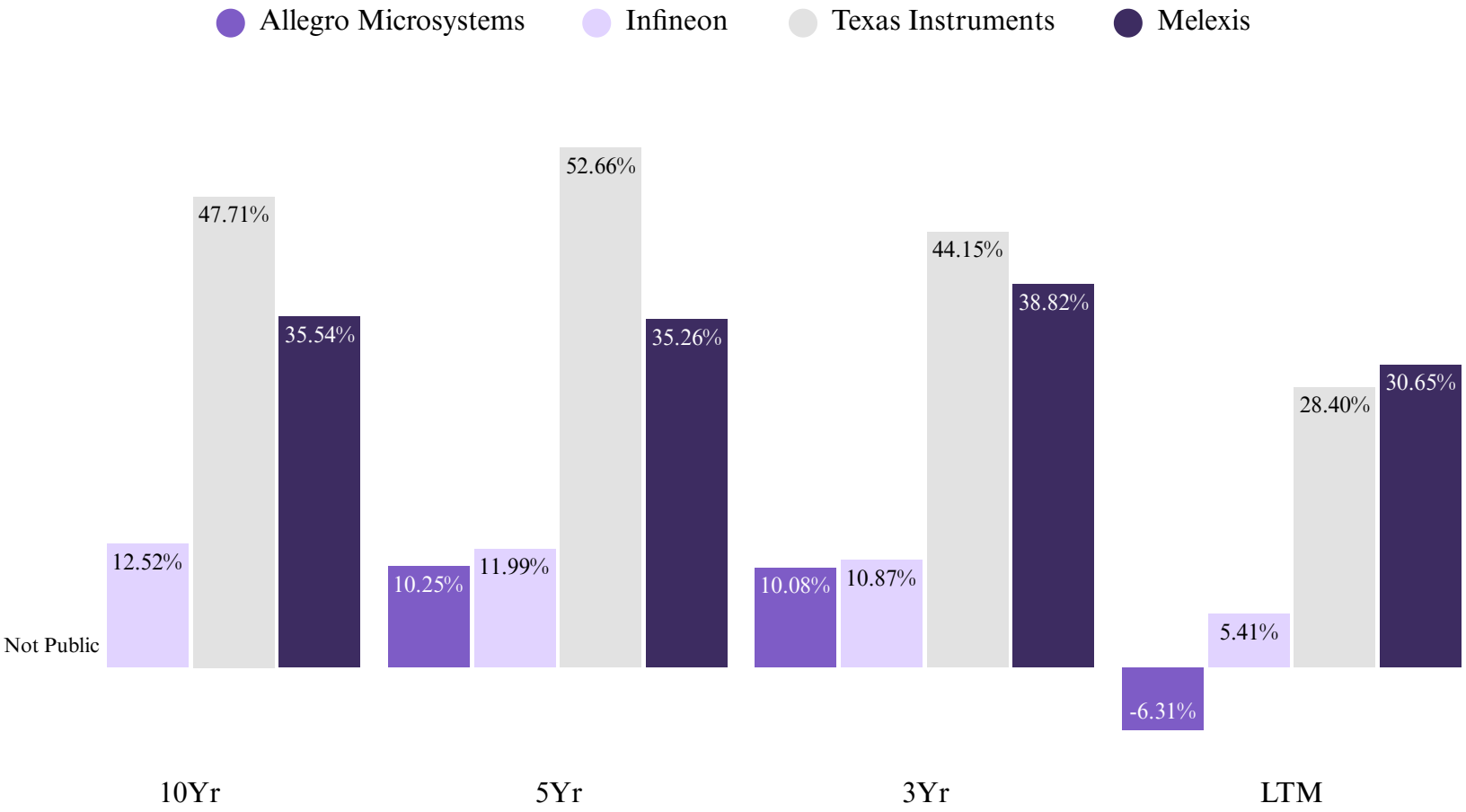


Comparative ROE findings are surprising, as Melexis ranks tenth among named competitors in consolidated sales.

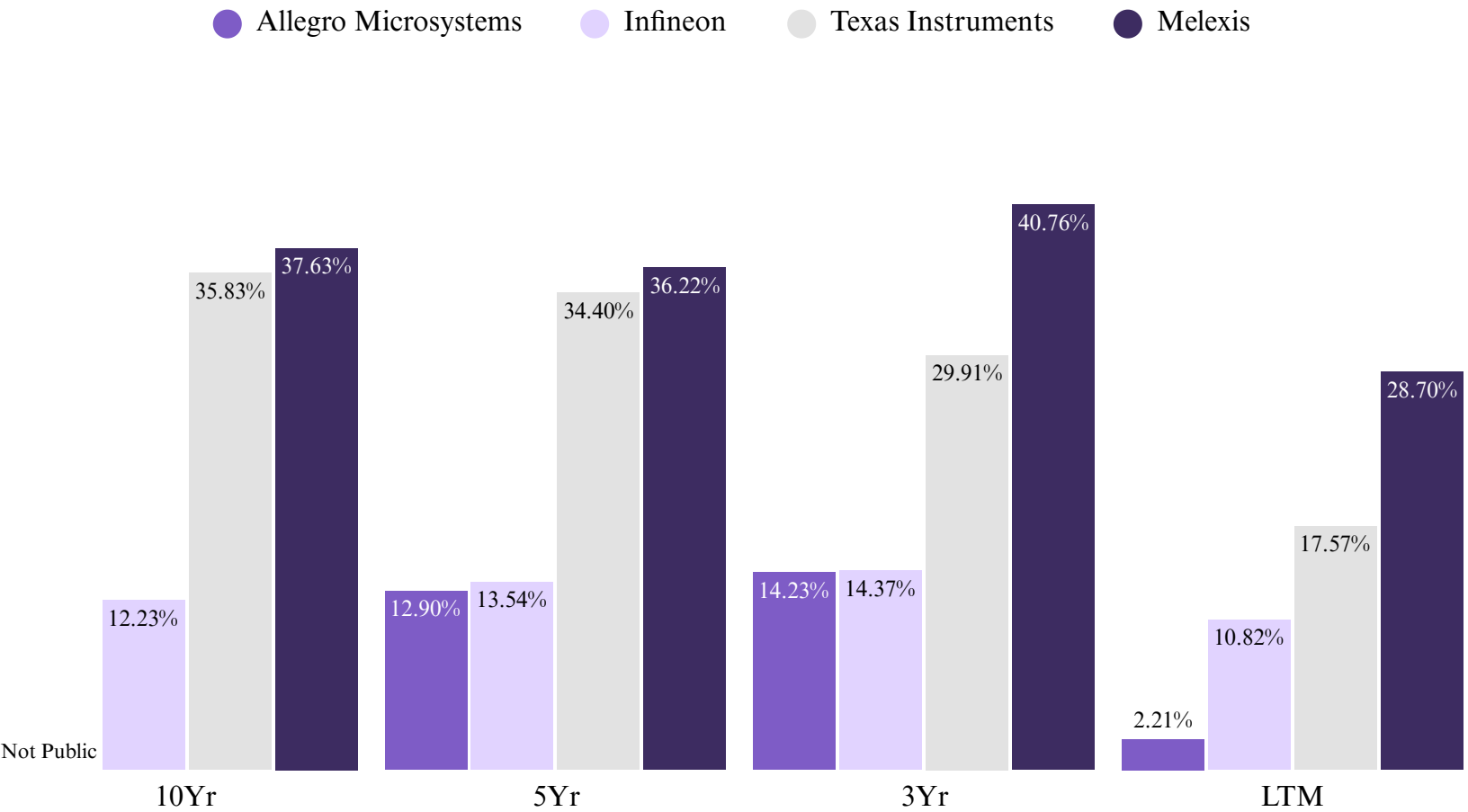


Focusing on competitors that share Melexis' core product markets, Texas Instruments is the only company among named competitors that has averaged higher ROE than Melexis over time. However, Texas Instruments' ROCE has historically lagged Melexis', and especially so in recent years.

Core Historical Average ROE

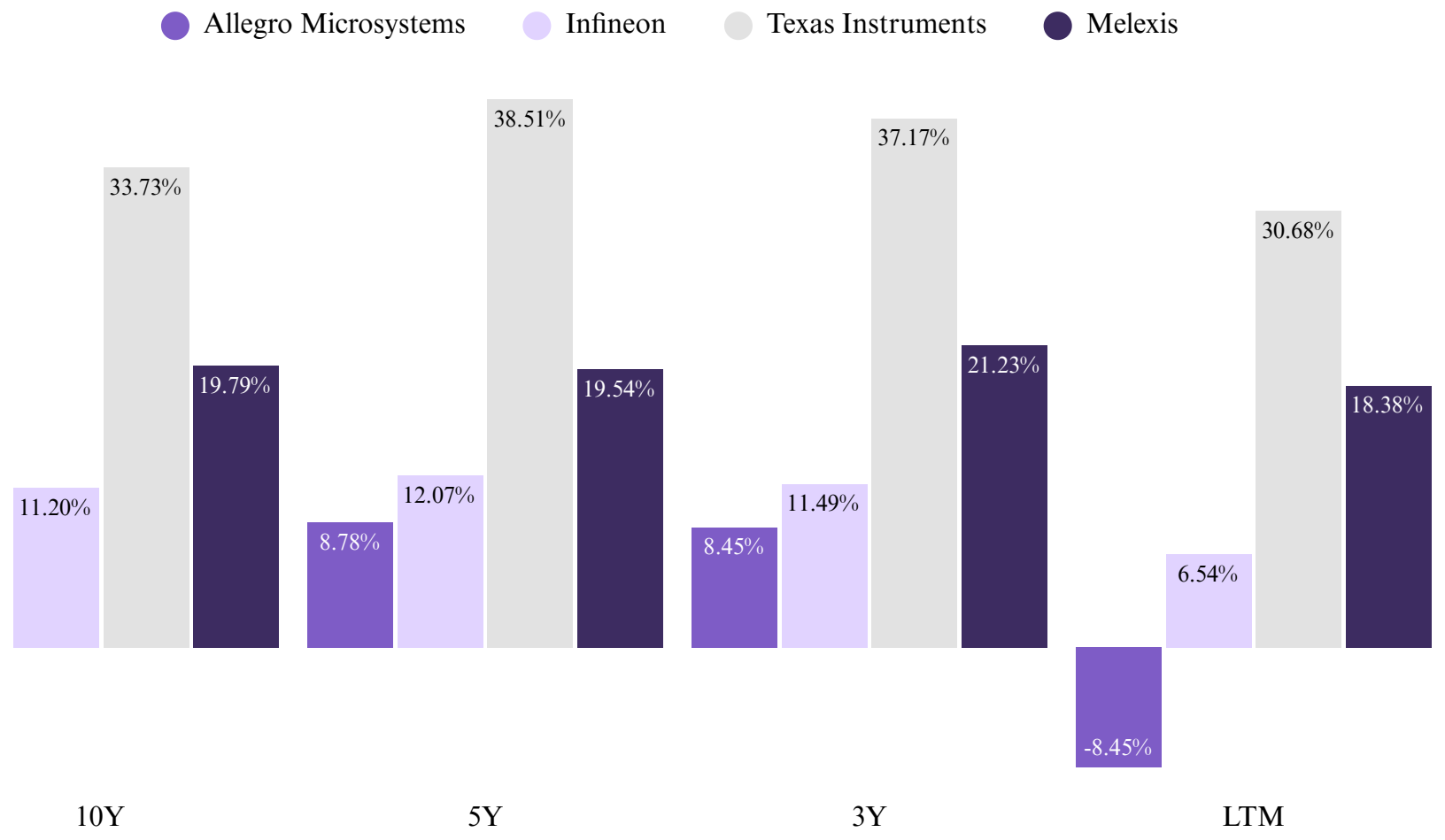


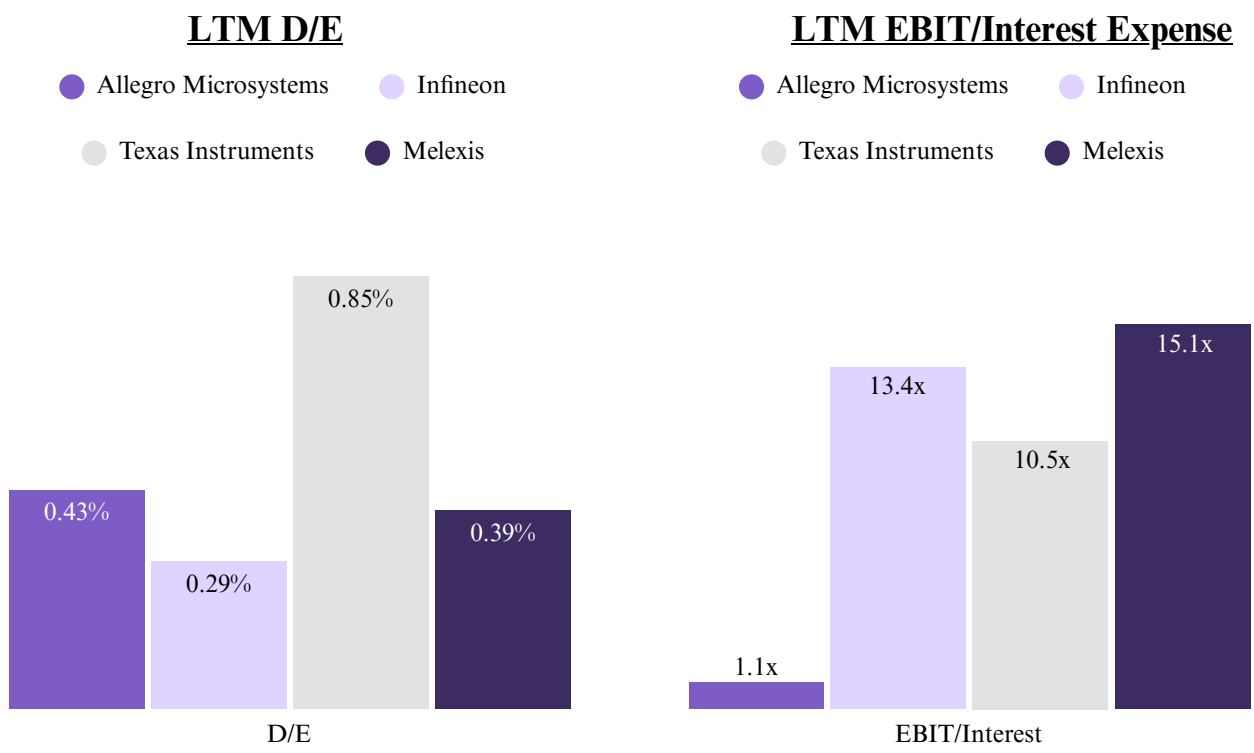
Core Historical Average ROCE



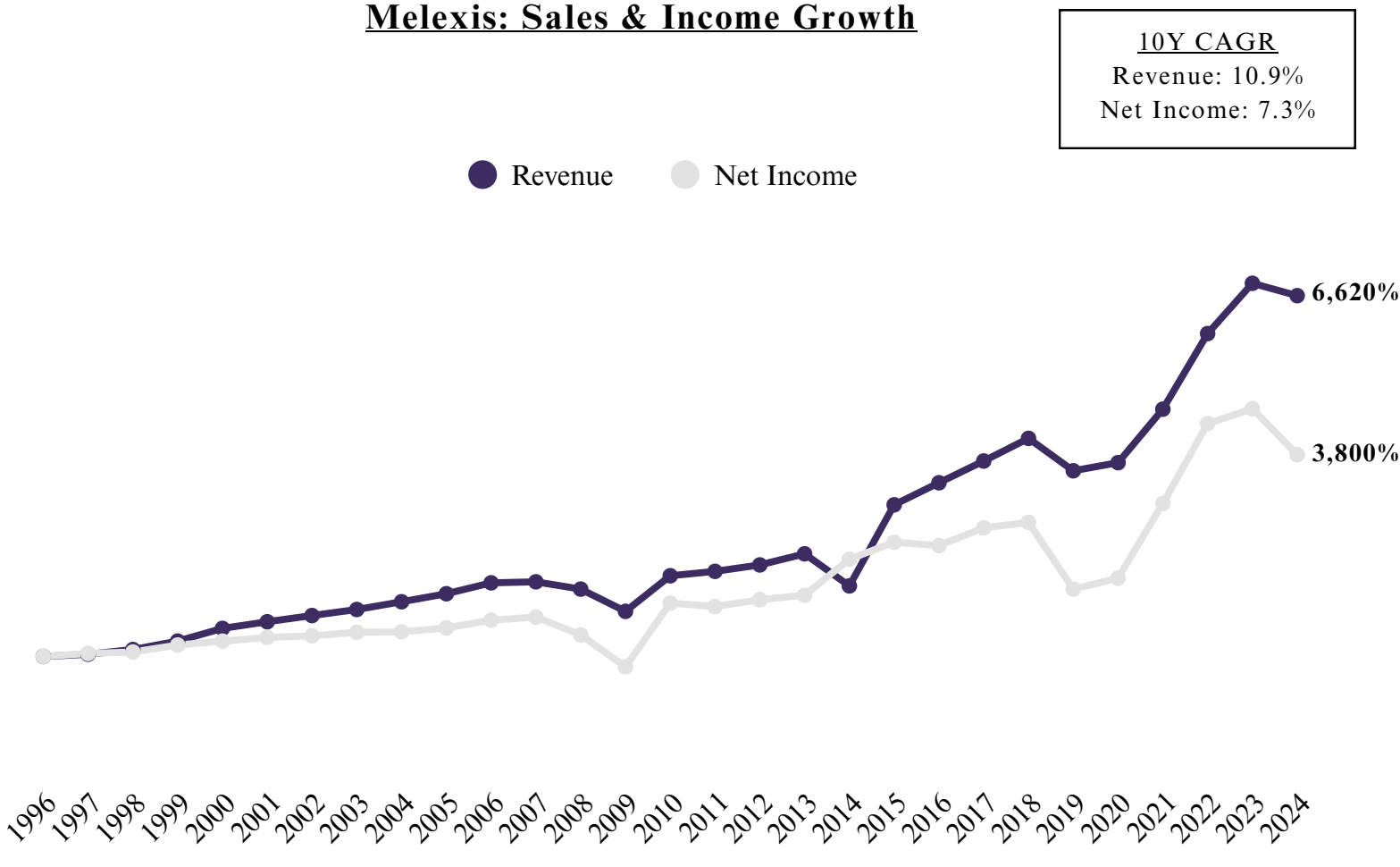
Melexis has also shown outperformance on the basis of net profitability, and the company maintains an attractive leverage position of 39% D/E and 15.1x LTM EBIT/Interest.

Core Historical Net Margin

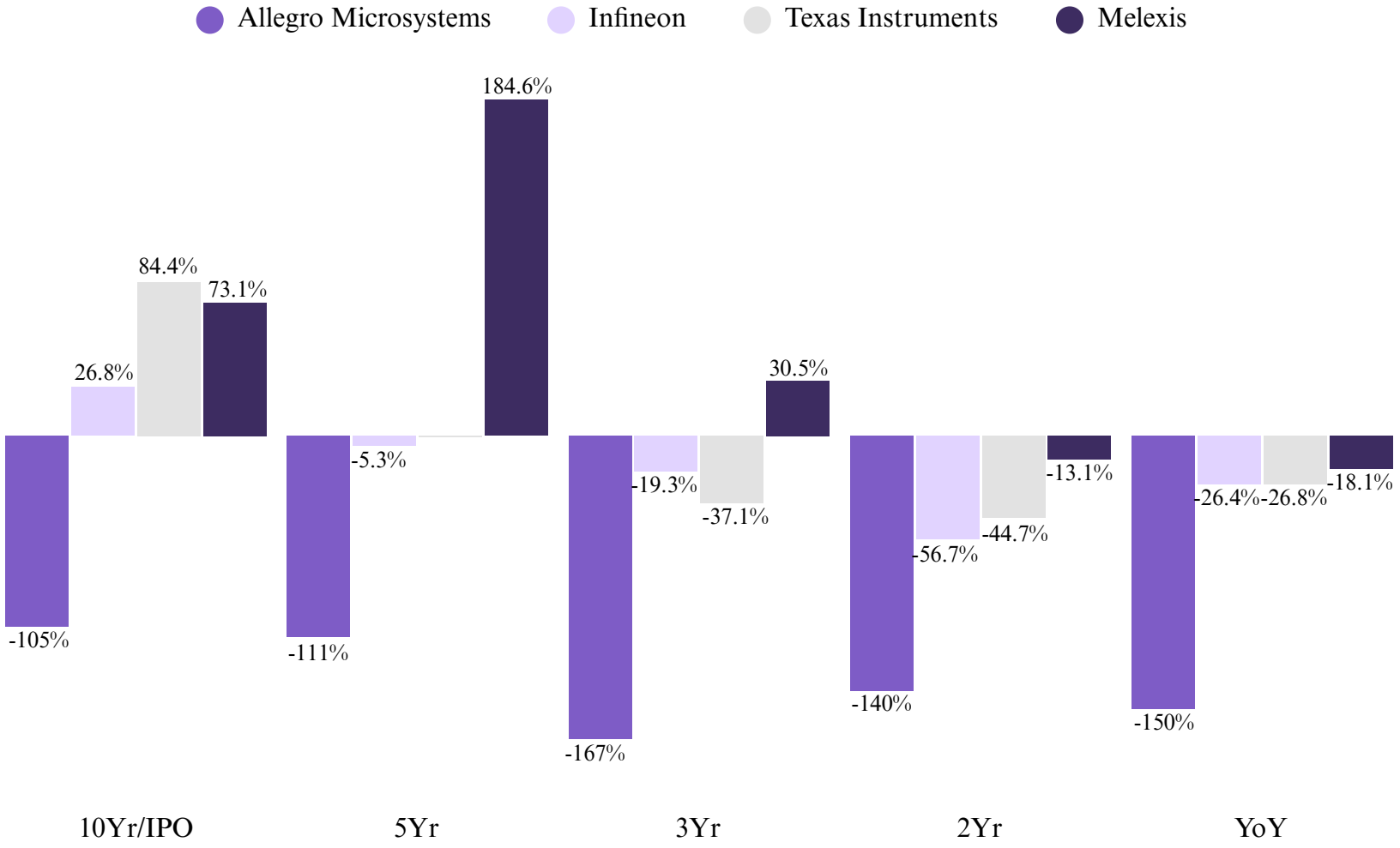




Melexis' sales and net income have grown steadily over time, with EPS performing above average over peers.

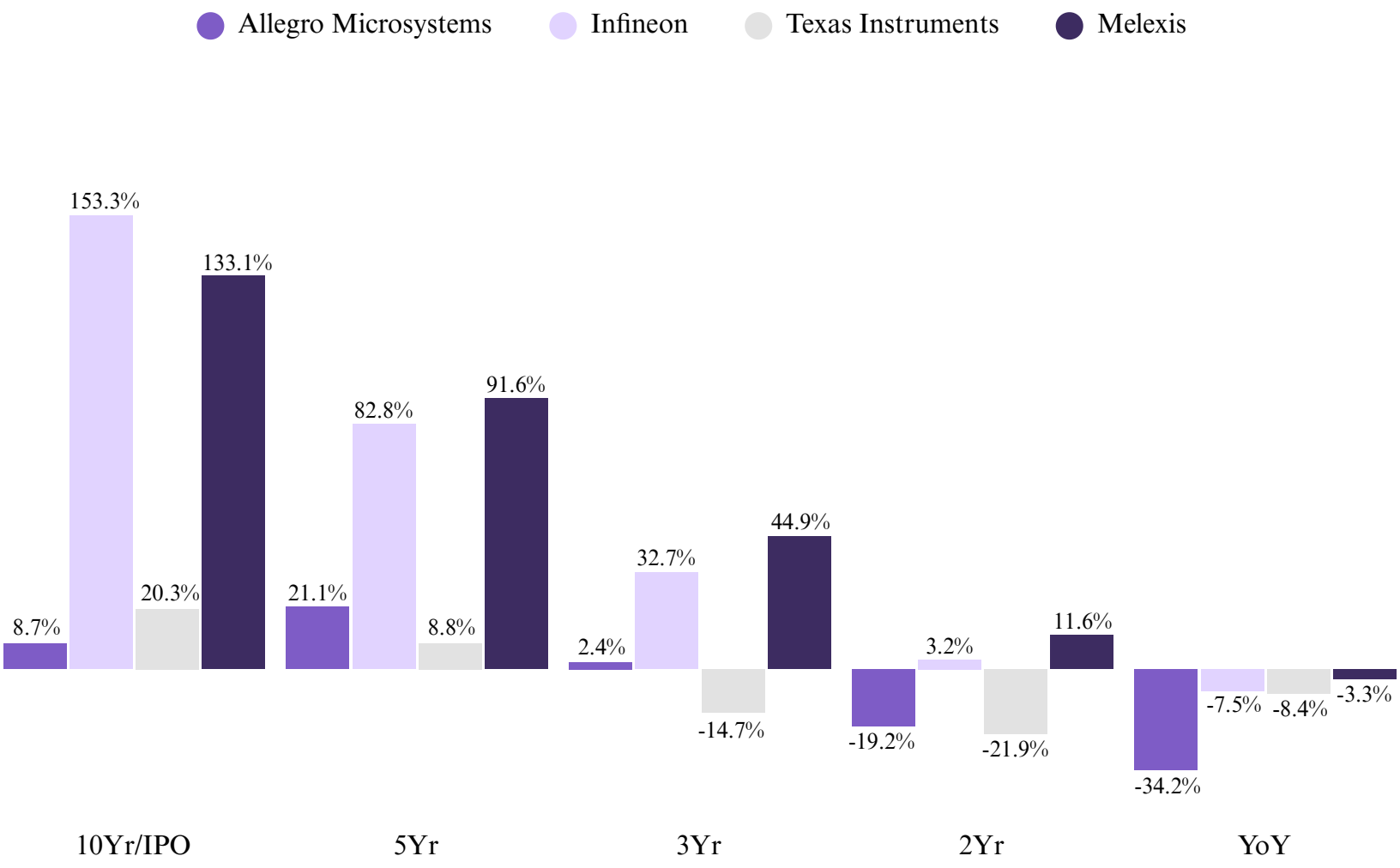


Core Comp Cumulative EPS Growth

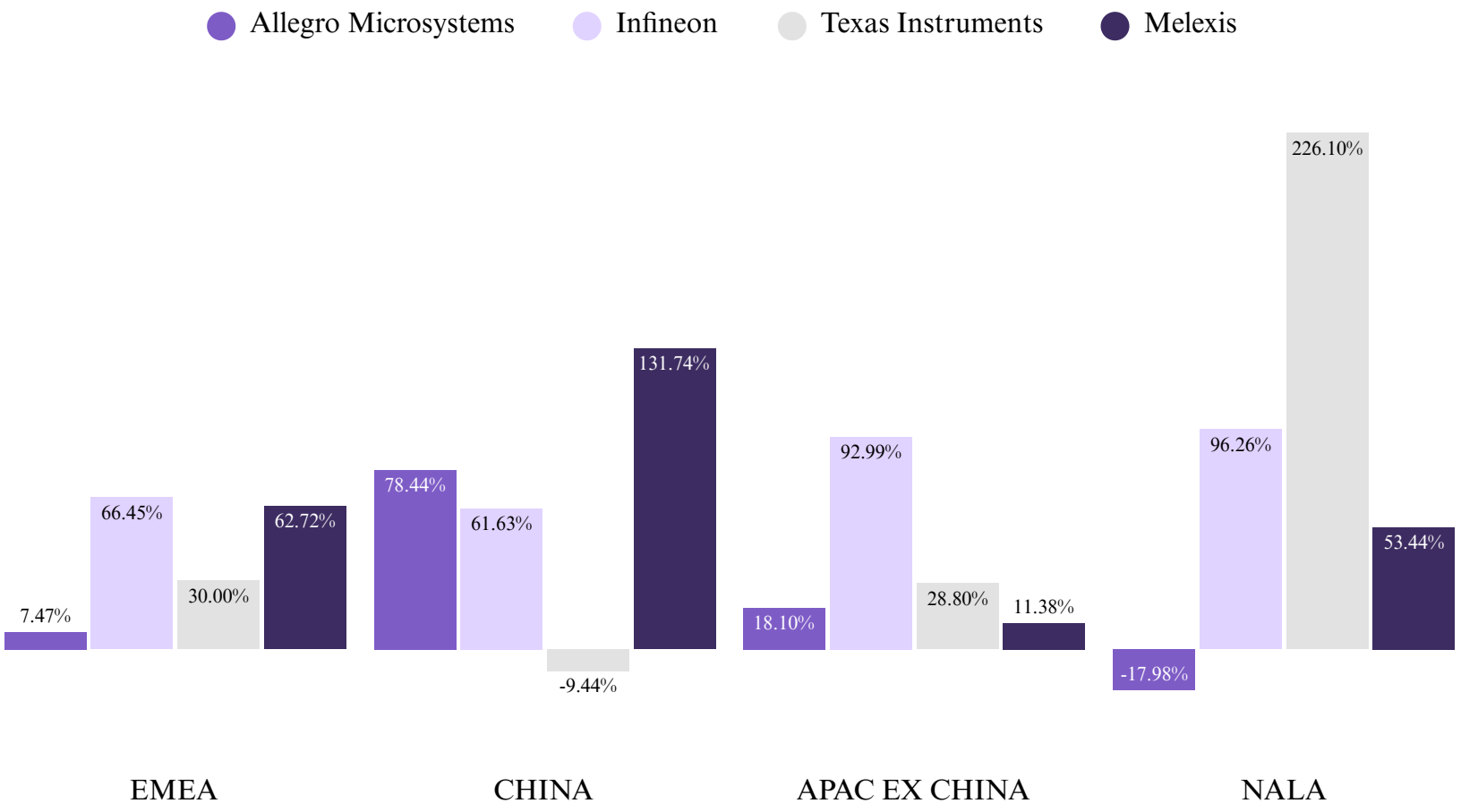


Melexis has further produced strong sales performance over core peers, particularly on a five-year basis. The company has been especially successful in China, as Melexis is a key supplier of BYD and Nio, the latter of which Melexis has a preferential sales contract with. Moreover, growth over Allegro in Europe corroborates suspicions that Allegro lacks favor with European automakers.

Core Cumulative Sales Change



2020-LTM Core Cumulative Sales Change by Region

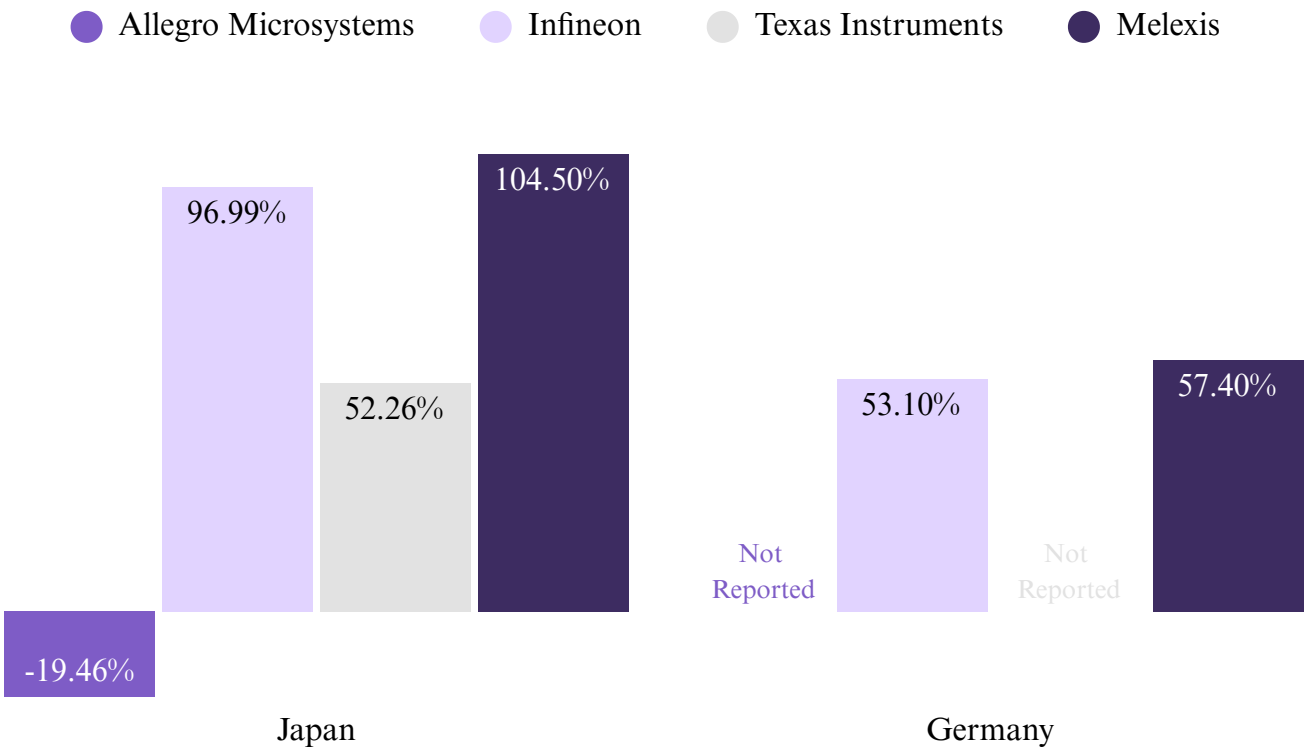


While Texas Instruments sets its sights on growing US operations, Melexis has captured significant share in China since 2020.

The timing has corresponded with an 818% increase in Chinese EV sales since 2020, which has seen Melexis' cumulative Chinese sales outpace Allegro's and Infineon's by 68% and 113.8%, respectively.

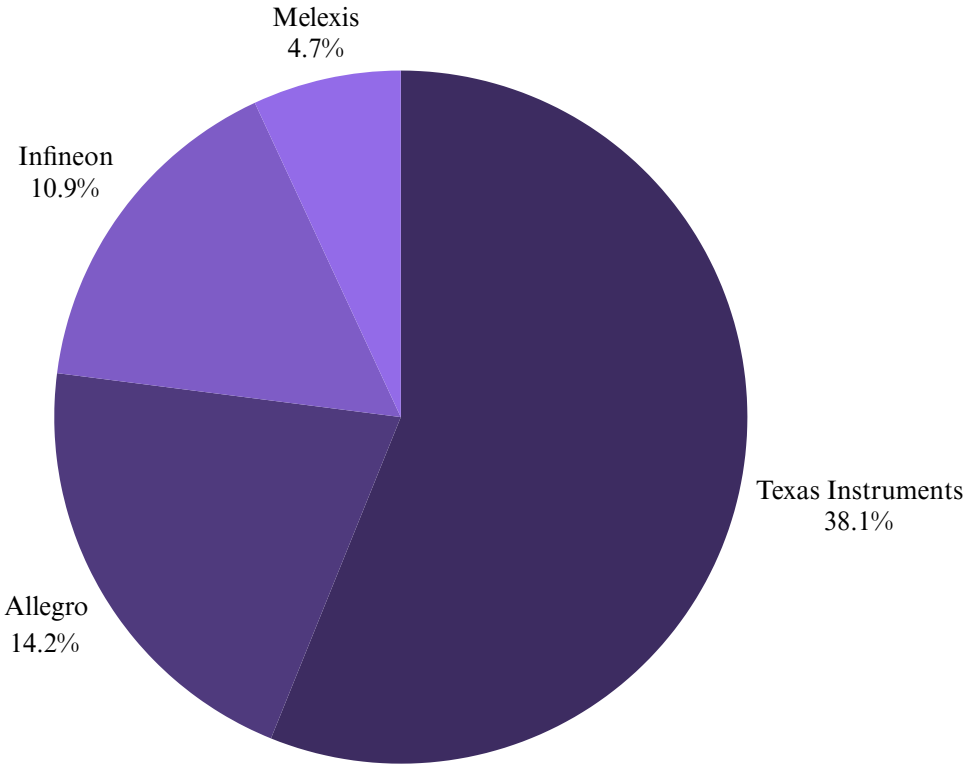
At the same time, outperformance in Japan and Germany has been a further boon for Melexis, where sales in the two regions comprise 21.6% of consolidated sales.

2020-LTM Core Cumulative Sales in Germany and Japan



Sales have not been as strong in America, which may be viewed as unique in relation to Infineon, Allegro, and Texas Instruments, as Melexis sports relatively low US exposure. Melexis' five-year US sales have grown by 26.1% cumulatively, versus -18% for Allegro, 88.7% for Infineon, and 226.1% for Texas Instruments.

Core Comp USA Sales Exposure



A positive of low US sales exposure is that it may insulate Melexis from American protectionism. That said, automotive sensors tend not to be a high expense for automakers. For example, Melexis' most expensive position sensor on Mouser Europe costs just €7.33 per chip for a batch order of 100 chips or more.

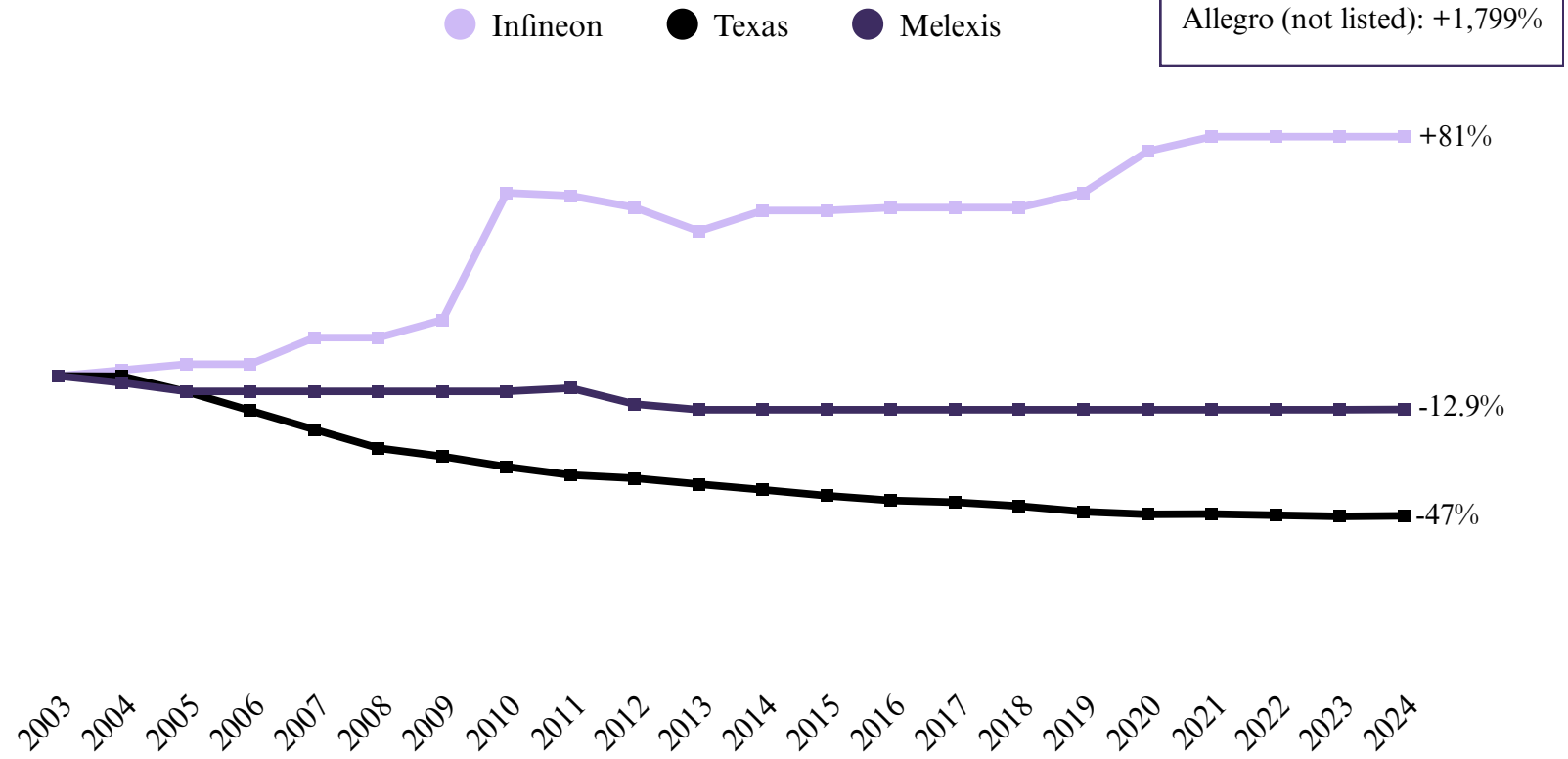
Considering Melexis' competitiveness and stable cross-cycle profitability, it is likely that the company can raise sensor prices above the rate of inflation over time. Recessionary risk is a concern, as the effective life of a sensor tends to be five to ten years, but this risk is more limited to legacy products approaching obsolescence.

Melexis is Dilution-Free

Stability in diluted shares outstanding is an added cherry for Melexis shareholders, with 12.9% of shares cancelled since 2004. Management recently announced a share buyback program to repurchase €50MM in shares, equal to 2.3% of Melexis' market capitalization at writing. The last time management bought back shares was during the Euro Crisis, when shares were demonstrably undervalued: a strong signal that shares are undervalued once more. Management's purchases under the current program have included 33,000 shares bought in March at an average price of €58.06 per share, or 6.8% higher than Melexis' current share price of €54.35

Core Comp Diluted Shares Outstanding 2003-2024

Change
Infineon: +81%
Texas: -47%
Melexis: -12.9%
Allegro (not listed): +1,799%

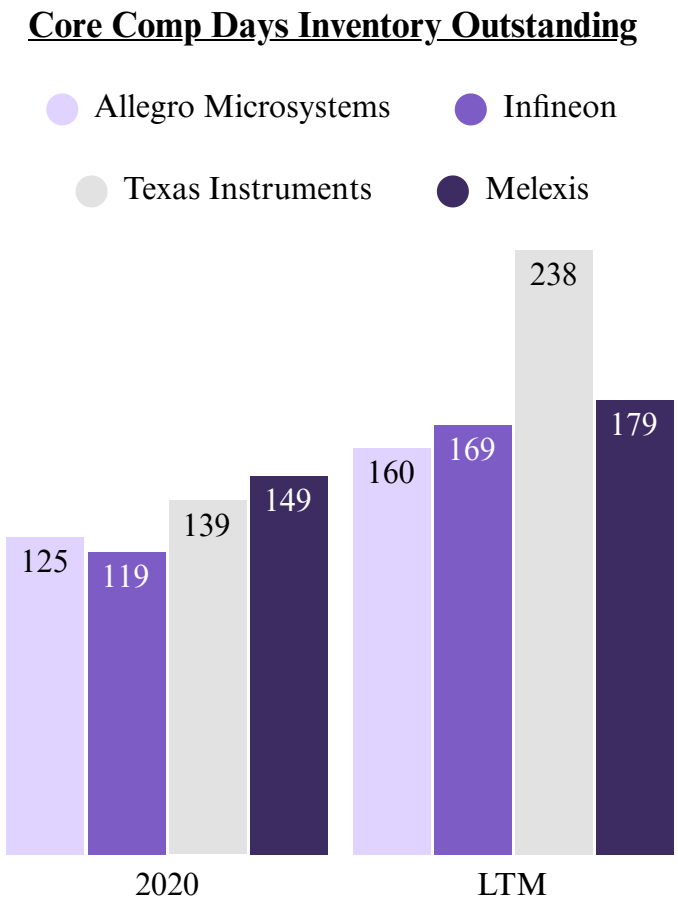


Allegro's equity dilution was not depicted in the chart above, as its extremity distorted the chart's visual quality. Allegro shareholders have been diluted by 1,799% since the company went public in 2020, with $463MM in acquisitions thus far adding little economic value. Melexis favors organic growth, with immaterial M&A contribution to sales and EPS over the past decade.

STATE OF THE MARKET

Uncertainty Begets Opportunity

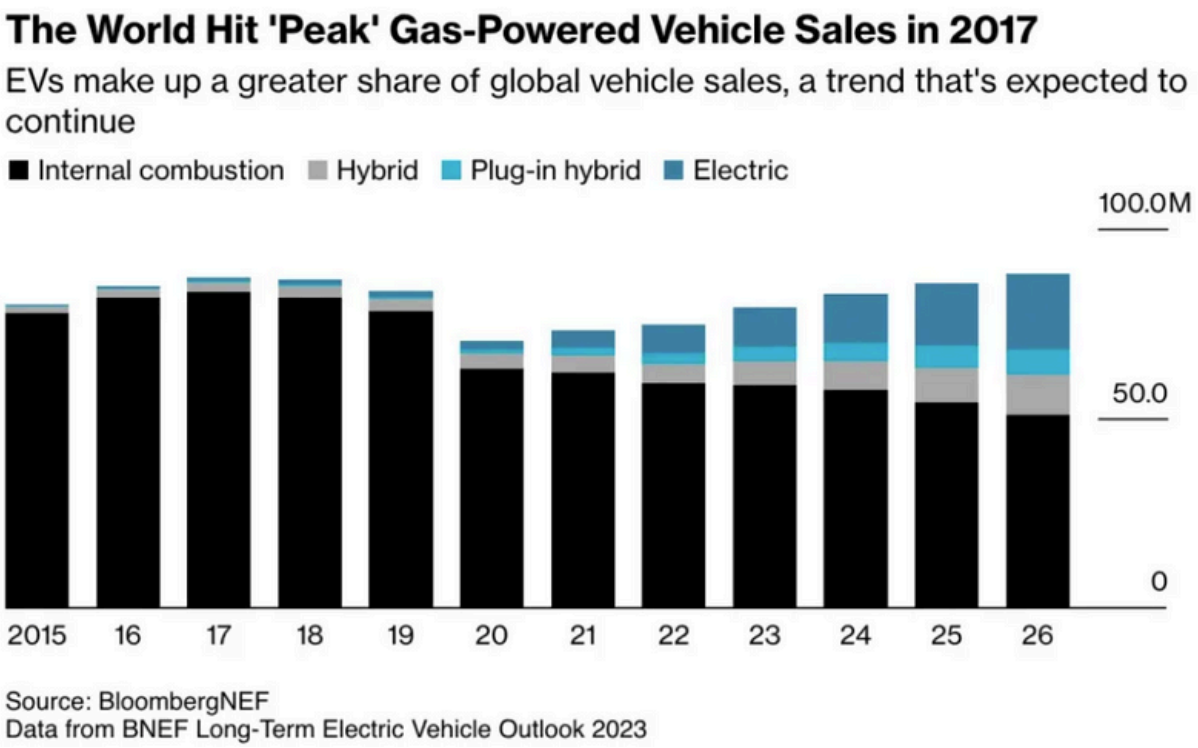
As disclosed, the automotive sensor market is presently in a downturn, as suppliers work through excess capacity built in the wake of Covid-19 chip shortages. Consequently, days inventory outstanding (DIO) has risen across the board, as several major automotive OEMs are similarly dealing with inventory overcapacity and price cuts.



Melexis tends to feature higher DIO over competitors, as lead times for Melexis chips take upwards of nine months. To prepare for sudden spikes in demand, management maintains additional inventory to maximize reliability with customers, as orders are frequently last-minute.

Electrification and More Electrification

Despite present overcapacity, trends in electrification are likely to favor Melexis in future years. Global BEVs and PHEV (EV) adoption has been growing rapidly in an otherwise flat auto market, with EV share rising from 2.5% of global light vehicles in 2019, to 15.8% in 2023. Meanwhile, ICEVs have declined by -25% since 2017.



China is leading global EV demand, with 36.5% growth reported in 2024. This amounted to 11 million units sold, or 65% of global EV sales. By contrast, only 1.3 million EVs sold in the US, backed by 7.3% growth for the year, while 2.96 million EVs sold in Europe: a decline of –2.2%. Europe's decline diverged unfavorably from 21.3% growth reported the prior year, but demand is expected to revert as major European economies recover from recession.

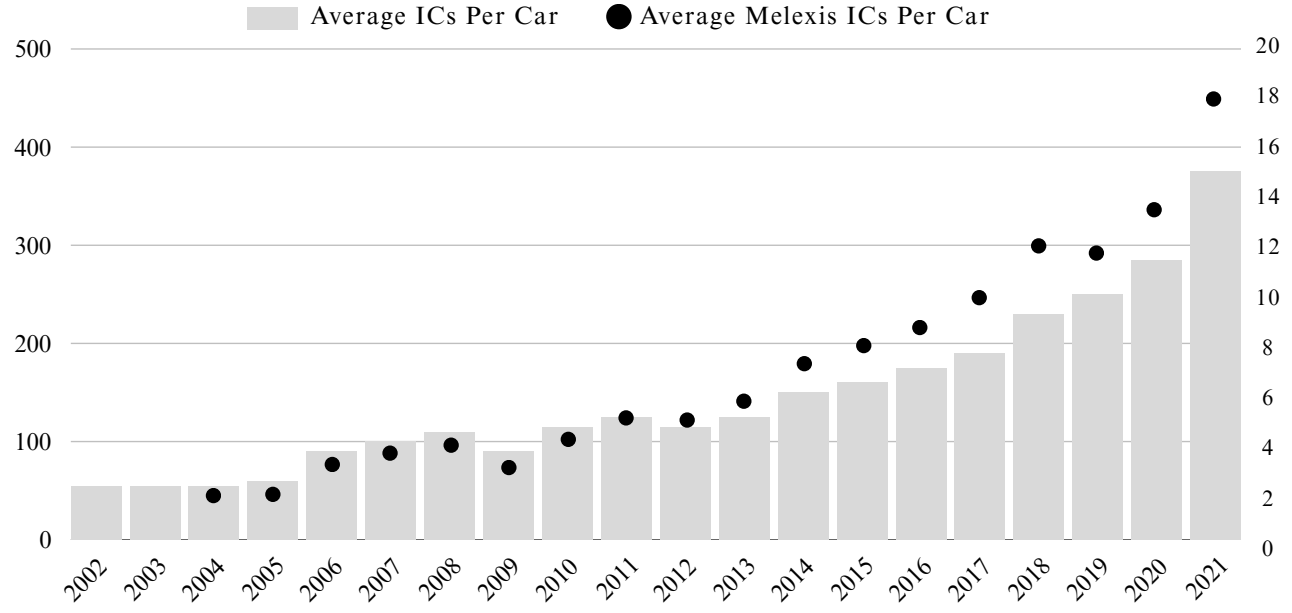
Focusing on China specifically, 2024 EV sales constituted 47.9% of vehicles sold in the region. The Communist Party of China (CPC) has set a goal for EVs to comprise 40% of China's vehicle fleet by 2030. With just 8.9% of China's current 353 million vehicle fleet EVs, continued Chinese demand bodes well for Melexis' forward growth.

Europe is also pursuing rampant decarbonization through the Green Deal, which is targeting a 55% reduction in greenhouse gasses by 2035 over 1990 levels. Part of the deal involves the elimination of new ICEV sales by 2035, with all 27 EU-member states having enacted at least one EV subsidy policy.

For instance, Germany has allocated €10bn to EV development, adoption, and infrastructure to date, with EVs presently tax exempt through December 31st, 2025. France has allocated €8bn, with EV purchase subsidies ranging between €4,000 to €7,000 for EVs with MSRPs below €47,500.

Why it Matters: Electrification Equals More Sensors

Melexis' tilt towards mid and high-end auto markets in Europe and Asia have historically resulted in the company achieving a faster rate of sensor growth per vehicle than the broader market.



Source: IHS Markit Light Vehicle Production; WSTS; Melexis FY2022 Investor Presentation

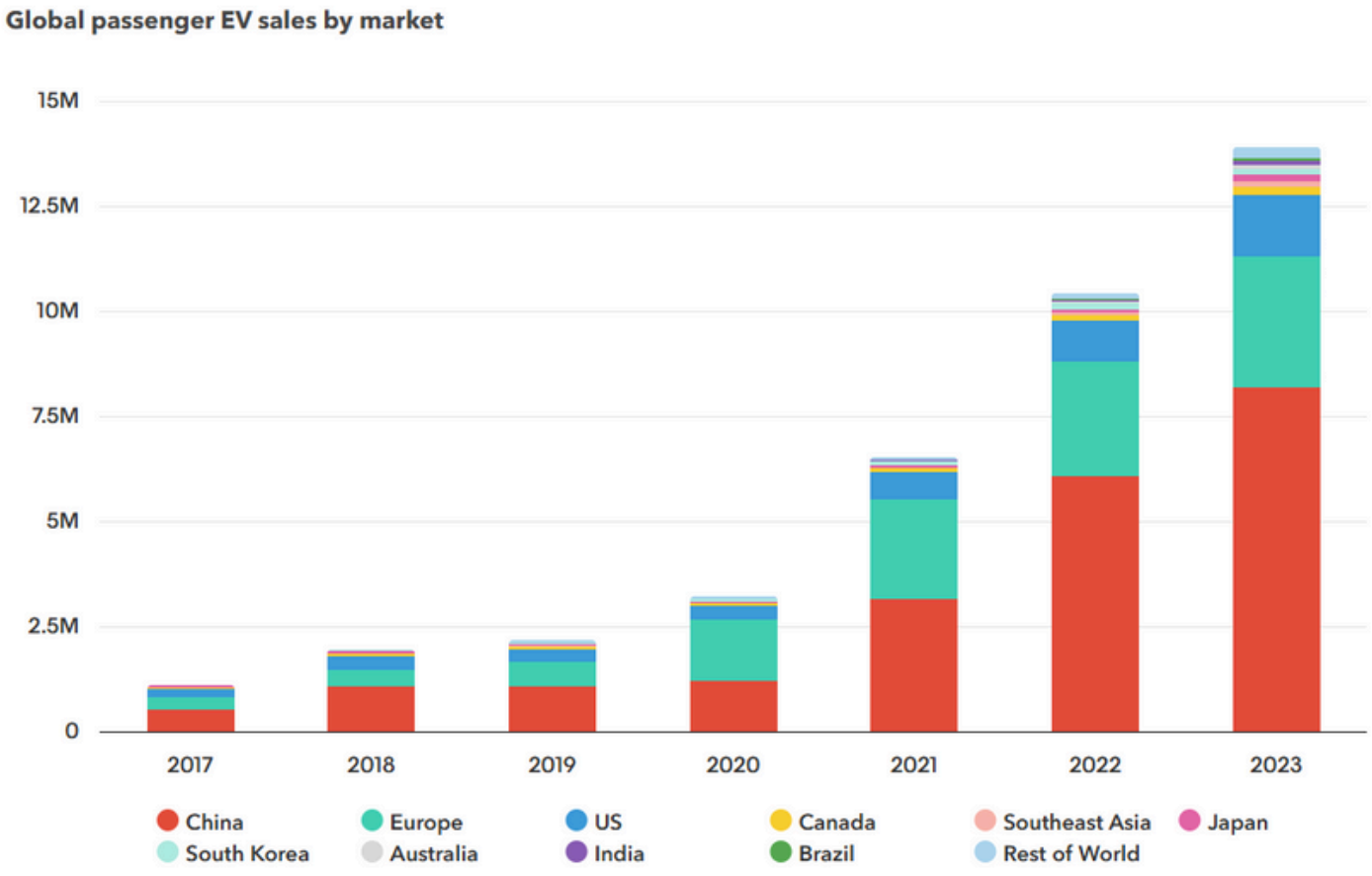
The latter is important in the context of electrification trends, as according to Melexis' reporting, mid to high-end EVs contain 50-70% more sensor ICs than ICEVs of the same class. This equates to high-end BEVs averaging approximately 650 sensors, compared to 400 sensors for high-end ICEVs, and 220 for mid-end ICEVs. Even low-end BEVs outpace ICEVs of the same class, with an average of 350 and 100 sensors per vehicle, respectively.

For example, while Melexis averages 18 sensors per vehicle among all vehicles on the road today, there are 57 Melexis sensors in the Nio ES6, 42 of which are related

ambient lighting sensors. Additionally, 22 to 27 of Melexis' chips are in the BYD Han, 32 are in the Volkswagen ID.3, 177 to 179 sensors are in the Mercedes-Benz EQS, and 58 to 60 are in the Tesla Model Y.

China Leads, Melexis Benefits

Melexis' success is being amplified by a unified Chinese political will that wants widespread electrification for all means of Chinese transportation, including public. China is responsible for 95% of the world's production of electric busses, and produces more EVs than every country in the world combined. Two-thirds of the worlds EVs are produced in the region, and of research papers published on battery technology, 65.4% are published by China, and only 11.9% are published by the US. China produces over 70% of the world's batteries, and Chinese EV makers are 30% faster than US, European, and Japanese competitors at bringing new vehicles to market.



Source: BloombergNEF

Understandably, people frequently associate Chinese products with cheaply produced, low-cost goods, but vehicles produced by Xiaomi, BYD, and SAIC all use high quality components and materials. Their interiors are luxurious, user-friendly, and well insulated, while their ride quality, safety, and performance are top-notch.

In the words of well-known car reviewer, Doug DeMuro:

"I drive these Chinese cars, and I'm astonished. They shouldn't have sent them to us [for review]. Now we know how good they are. They're way ahead. If we let capitalism sort this [market] out, China wins this game."

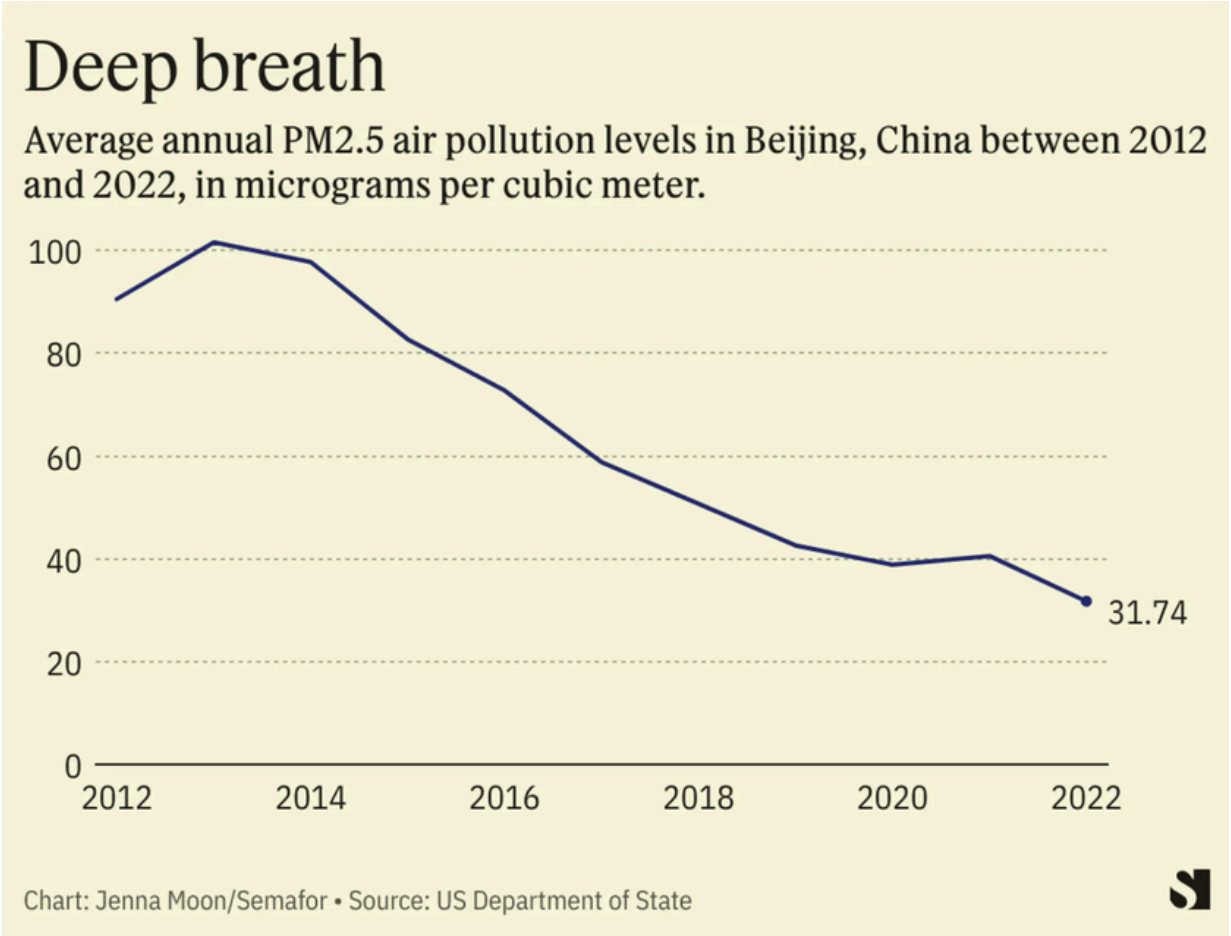
One of the vehicles that Doug reviewed, the Xiaomi SU7, broke the seven-year world record for fastest four-door sedan lap speed at the Nürburgring Nordschleife racetrack last year. What makes the Xiaomi SU7 compelling is not that foreigners can buy its record-breaking trim for just $45,000, but that Xiaomi is known for being a consumer electronics company, not an automaker. Even more impressive is that Xiaomi took the SU7 from concept-to-market *in just two years*.

The Xiaomi SU7

Source: Reuters

How does a consumer electronics brand develop a car from zero to record-breaking in such a short amount of time (and sells >20,000 units per month)? Evidently, it is because the level of know-how and sophistication for EV design and production in China is high.

The Chinese have been heavily subsidizing EV R&D and infrastructure development for twenty years, with $230 billion in subsidies provided by the CPC to domestic EV and battery makers since 2009. The reasons for investing in the technology were clear. Politicization of ICEVs in the US, coupled with risk-averse producers in Japan and Europe, spurred underinvestment in EV technology. China saw legacy automaker apathy as an opportunity to leapfrog the competition, and to combat city pollution at the same time.



Source: Semafor

China's EV superiority is why the US presently maintains a 250% tariff on Chinese EVs: They are leagues better and more affordable than American alternatives.

Still skeptical?

The unavailability of Chinese EVs in the US did not stop Ford's CEO, Jim Farley, from buying one. Between 2023 and 2024, Jim travelled to China to test the country's EVs. Farley ultimately imported a Xiaomi SU7 to continue his assessment in America (a "test" that he reportedly continues today). He describes the SU7 as "fantastic," and concluded from his auto tests that the sophistication, quality, and capabilities of Chinese EVs pose an "existential threat" to US automakers.

Tariffs: Assessing German Automaker Exposure

Considering Melexis works with most major European automakers, it is worth discussing the exposure of German automakers to US tariffs, as the imposition or threat of tariffs may postpone Melexis' near-term recovery.

In 2024, only 7.6% of Volkswagen's unit deliveries went to the US. Mercedes-Benz and BMW were more exposed, with the US accounting for 16.4% and 22.7% of 2024 deliveries, respectively. Fortunately, Mercedes' plant in Tuscaloosa, Alabama, has a production capacity of 300,000 vehicles per year: just shy of the company's 324,529 units delivered to America in 2024. By contrast, BMW's plant in Spartanburg, South Carolina has a production capacity of 450,000 vehicles per year, which surpassed the 371,346 BMWs the company domestically sold in 2024. Meanwhile, Volkswagen delivered 658,314 units to the US in 2024, but only produced 234,000 vehicles at its plant in Chattanooga, Tennessee.

Not all components that constitute American assembled BMWs, Mercedes, and Volkswagens are sourced from America, but BMW and Mercedes may be able to more easily pass on tariff-induced inflationary costs to consumers, as the average

American BMW and Mercedes customer boasts a household income in the 80th percentile.

Consequently, Volkswagen may be the most vulnerable of the three German automakers to US tariffs, as its vehicles are not high-end, and the company's domestic manufacturing shortfall will probably be remedied by its Mexican production. These factors imply higher tariff risk in the wake of probable lower pricing power.

Macroeconomics Shmacroeconomics

While thinking about the exposure of German automakers to US tariffs is not without merit, it is a relatively hapless activity. Accurately forecasting the long-term, *potential* first and second-order consequences of US tariffs on global automakers is beyond Maiden's purview. There is no guarantee that tariffs will permit US automakers breathing room to catch up to the Chinese, and understanding the extent of tariff impact on European and Asian market EV demand is equally difficult.

What is within Maiden's purview is to assess the facts as they are:

1. Melexis is the dominant and regionally best positioned producer of magnetic latch & switch and position sensors on Earth
2. These sensors serve as picks and shovels for trends in automotive electrification, safety, and user comfort
3. Automakers will depend on Melexis' sensors for a long time

Melexis' core product markets are also small. Transparency Market Research quoted the global automotive magnetic position sensor market at $955MM in 2023, while Global Growth Insights estimated the automotive magnetic latch & switch sensor market to be $679.4MM in 2024.

Taking into consideration a) Melexis' LFY consolidated revenue of €932.8MM, and b) the number of magnetic latch & switch and position sensors that Melexis offers, and the estimations provided by Transparency and Global Growth Insights are more likely accurate than not.

Named competitor exposure to automotive markets was $39bn in 2024, which does not account for all industry participants. Hence, Maiden estimates that Melexis' top two product categories form less than 6% of the global automotive sensor market, without taking into account variations in technological characteristics and end-markets.

Melexis' hyperfocus on a small portion of the automotive sensor market likely dissuades competition from larger peers. Melexis' named competitors, excluding Allegro and Elmos (Elmos has no material core exposure), produce average annual sales of €10.57bn. Consequently, competing with Melexis in its core product markets would not materially move the needle for large incumbents.

Case-in-point: Magnetic latch & switch and position sensors account for 0.54% of Texas Instruments' total products on Mouser Europe, and 1.6% of Infineon's: Both categories are simply not a source of focus for either company.

Better yet, Chinese investment is overwhelmingly focused on leading-edge chips, not lagging-edge chips. In support of the previous, CEO Marc Biron has noted that a lack of education is a barrier to attracting global talent, as education on lagging-edge technology is increasingly being removed from academic curriculums. In fact, Maiden has not identified a single Chinese competitor with material overlap in Melexis' core product markets.

With all this being said, the practical understandings that can be discerned from the findings of this report are that a) automakers need magnetic sensors for safety and

comfort applications, b) Melexis' market position is relatively assured, c) Melexis' industry is too niche, too small, and not trendy enough to attract sizeable capital and education dollars, d) Melexis' regional markets are serious about decarbonization, and therefore, e) Melexis is likely to sell more of its products over time, regardless of which automakers win or lose, or if robotaxis take over the world.

Beyond Automotive

As an aside, it is worth noting that Melexis does not merely sell its sensors to the automotive market. For the past ten years, sales through Melexis' "Beyond Automotive" segment have consistently accounted for 10% of annual sales. The ICs sold through the segment are mostly designed for automotive applications, but are also cross-sold into other markets.

For example, Melexis' temperature sensors are used in Google Pixel products and medical grade, contactless thermometers, while Melexis' Triaxis sensors are sold to producers of videogame consoles, home appliances, and industrial robots.

Marc Biron has stated that Melexis will remain an automotive-focused company, but that the opportunity to continue to cross-sell its sensors into adjacent markets is a cherry on top of its legacy foundation. Marc expects the segment to grow at 15% per year through 2028, with the target of increasing segment share to 15% of total sales over time.

Intelligent engagement with the pertinence of Melexis' Beyond Automotive segment was not conducted as part of this report, but the segment has generally grown in-line with automotive sales over time. Maiden views the supplementary segment favorably, as cross-selling outside of automotive markets creates some degree of diversification, and increases optionality during periods of inventory destocking.

Management

Melexis maintains a small, six-person board, with an impressive average tenure of 15.5 years. Françoise Chombar and Roland Duchâtelet have assisted in Melexis' growth and development since its beginning, while Marc Biron has thus far done an excellent job at managing the company following Françoise's transition from CEO to chairwoman in 2021.

Marc Biron, CEO, 54

Marc Biron has worked for Melexis since 1997. He holds a BSc in electrical engineering, and a PhD in applied science from the University of Liège.

After working an assistant gig at his Alma Matter, Marc joined Melexis as an analog sensor designer, just one year after the company had invented the world's first magnetic, programmable linear hall sensor (a two-axis sensor that can be programmed to meet the specific needs of any vehicle). Marc eventually rose to take over management of the magnetic hall (latch & switch) sensor unit, and served as vice president of product and quality development prior to his CEO appointment.

Roland Duchâtelet, Director, 78

Roland, a Melexis co-founder, holds a BSc in applied economics, an MBA, and a PhD in electronic engineering from the University of Leuven. Roland has extensive experience in business development and M&A, having aided Elmos GmbH's early development, and having overseen the sale of more than fifty companies throughout his career. Roland stepped back from

his position as Melexis' chairman in 2021, but continues as a director with the company. Roland also holds a directorship at Integrated Micro-Electronics, a semiconductor testing and assembly business based in the Philippines.

Françoise Chombar, Chairwoman, 62

Françoise, another Melexis co-founder, has served in various executive roles since joining Melexis in 1997: First as COO, from 1997 to 2003, and then as CEO from 2004 to 2021. Unlike Marc and Roland, who have extensive academic backgrounds in engineering and science, Françoise is a liberal arts graduate. She holds an MA in Dutch, English, and Spanish interpretation from the University of Gent, but her lack of a formal science background has had no observable adverse impact on Melexis' success.

Incentives

Melexis' executive incentive package is lackluster, and an official policy has only been in place since 2011.

Marc Biron' renumeration is comprised of fixed income and an annual cash bonus. No component of any executive or director compensation is stock-based.

Marc's bonus is dependent on sales and EBIT growth, with 50% of the cash bonus based on one-year's performance, 25% on two-year's performance, and 25% on three-year's performance. Payment is contingent on growth ranging from <10% to >15%, per the chart below.

		Revenue growth		
		<10%	>10% - <15%	>15%
EBIT growth	<10%	0	25%	50%
	>10% - <15%	50%	75%	100%
	>15%	75%	100%	100%

Source: Melexis 2024 Annual Report

Although incentives are a crucial component for ensuring operational excellence, it may be helpful for readers to recall the findings from Maiden's report on Hingham Institution for Savings, which, through comparison of 138 US regional banks, found direct ownership to be the primary determinant of operational outperformance.

Hingham's managers understand the behavioral power of ownership well, and do not maintain an executive remuneration program beyond fixed income, for they believe that direct ownership is incentive enough for a manger to perform optimally.

As such, one might argue that there is a reduced need for Melexis' owners to rethink Marc's remuneration package, given Françoise's and Roland's continued involvement in the company, and their ownership of it. They direct Marc and company share repurchases, not the other way around.

Should a change in ownership occur, it would be sensible for investors to advocate for the restructuring of Marc's remuneration to encourage the continued optimization of company profitability and efficiency. What matters in the interim, is that Melexis' founders remain aligned with minority shareholders.

VALUATION

A Polished Collector for Cheap

At 10.85x EV/EBIT, Melexis is in its 15th percentile of historical valuation—adjusted for dot-com and GFC distortions—is near the low of its ten-year valuation range, and is valued at half its ten-year average EV/EBIT of 21.8x. Melexis' 12.82x P/E is further –65% off its ten-year average of 36.6x, and –54.9% off its lifetime, normalized average of 28.4x. In light of Melexis' high cross-cycle profitability and efficiency, higher average historical valuation multiples are unsurprising.

Multiple distortion in reaction to subdued demand in the first half of 2025 may expand Melexis' P/E and EV/EBIT multiples prior to earnings normalization. However, any potential expansion is unlikely to have sustained impact, as shares of Melexis are currently –50.9% off their five-year high of €110.80. It follows that five-year growth may trend supernormal, as Melexis is working from a low industrial base. With the prior in mind, two scenarios to assess Melexis' valuation were constructed.

Scenario One: Muted Growth and Profitability

In the first scenario, growth falls meaningfully short of management's expectations over the next five years, but share buybacks provide a slight boost to EPS. Instead of management's projected five-year sales growth of 10% to 15% per year, a general market downturn limits annual top-line growth to 5.5%.

Sales decline –18.5% in 2025, and five-year EBIT margins average 22.1%, versus Melexis' ten-year average of 23.2%. Net margin declines by 170 basis points from Melexis' ten-year average to 18.1%, and interest payments remain historically elevated at a net expense of €10MM per year.

Recovery begins in 2026 as supply and demand normalize, and Melexis ends 2029 with €1.2bn in sales, or 24.9% above Melexis' 2023 high of €964.3MM. Should the latter materialize, it would mark the company's slowest five-year, early-cycle cumulative sales growth in the company's history.

By 2029, EV demand spurs relative optimism for Melexis shares, with company EPS of €5.53 valued at a multiple of 15x, or –47.2% below the company's lifetime average P/E multiple, and –59% below its ten-year average.

Shares end 2029 at €82.90, or –25.1% below Melexis' 2021 high. Melexis' share price remains flat versus twelve years prior, irrespective of electrification tailwinds and the company's competitiveness. Foreign shareholders receive €6.28 in net dividends during the five-year holding period, assuming a combined tax rate of 56.6%, a payout ratio of 55%, and a dividend reinvestment rate of 8%.

Should the prior scenario manifest, the total prospective compounded annual rate of return from Melexis' present price will be 10.47%.

Valuation 2025-2029: Baseline					
Year	**2025**	**2026**	**2027**	**2028**	**2029**
Sales	€760,000,000	€1,028,424,000	€1,081,902,048	€1,141,406,661	€1,204,184,027
Gross Profit	€304,000,000	€442,222,320	€486,855,922	€513,632,997	€541,882,812
Gross Margin	40%	43%	45%	45%	45%
EBIT Margin	22.10%	22.10%	22.10%	22.10%	22.10%
EBIT	€167,960,000	€227,281,704	€239,100,353	€252,250,872	€266,124,670
Interest Expense	€10,000,000	€10,000,000	€10,000,000	€10,000,000	€10,000,000
Pre-Tax Income	€157,960,000	€217,281,704	€229,100,353	€242,250,872	€256,124,670
Tax Rate	15.00%	15.00%	15.00%	15.00%	15.00%
Net Income	€134,266,000	€184,689,448	€194,735,300	€205,913,241	€217,705,969
Shares Oustanding	39,390,000	39,390,000	39,390,000	39,390,000	39,390,000
EPS	€3.41	€4.69	€4.94	€5.23	€5.53
Payout Ratio	55%	55%	55%	55%	55%
Dividends Per Share	€1.87	€2.58	€2.72	€2.88	€3.04
Divdend Tax 56.6%	€0.83	€1.14	€1.21	€1.28	€1.35
Reinvest Rate 8%	€0.90	€1.24	€1.30	€1.38	€1.46
P/E 15x	€51.13	€70.33	€74.16	€78.41	€82.90
Total 5Y CAGR	**10.47%**				

Scenario Two: Reasonable Growth and Profitability

In the second scenario, growth still falls below management's expectations, with 9.3% annual sales growth over FY2023. FY2024 is marked by a –14.2% decline, but sales rebound to a new high of €1.13bn in FY2026 as demand reverts.

EBIT margin is maintained at Melexis' ten-year mean of 23.2%, and net interest expense remains at €10MM per year with respect to higher interest rates. EPS ends 2029 at €7.31, marking an 11.5% CAGR over FY2024 EPS of €4.24, and a reasonable 5.9% CAGR over FY2023 EPS of €5.18.

The market values Melexis closer to its historical average P/E multiple at 22x. Melexis concludes 2029 with a share price of €152.32, or 37.5% higher than its 2021 peak. Thanks to a slightly elevated payout ratio of 60%, and assuming the same 56.6% foreign total tax rate, net reinvested dividends of €8.39 improve total return to €160.71, for a five-year CAGR of 24.2%.

Valuation 2025-2029: Reasonable					
Year	**2025**	**2026**	**2027**	**2028**	**2029**
Sales	€800,000,000	€1,128,697,680	€1,241,567,448	€1,365,724,193	€1,502,296,612
Gross Profit	€320,000,000	€507,913,956	€558,705,352	€614,575,887	€676,033,475
Gross Margin	40%	45%	45%	45%	45%
EBIT Margin	23.20%	23.20%	23.20%	23.20%	23.20%
EBIT	€185,600,000	€261,857,862	€288,043,648	€316,848,013	€348,532,814
Interest Expense	€10,000,000	€10,000,000	€10,000,000	€10,000,000	€10,000,000
Pre-Tax Income	€175,600,000	€251,857,862	€278,043,648	€306,848,013	€338,532,814
Tax Rate	15%	15%	15%	15%	15%
Net Income	€149,260,000	€214,079,182	€236,337,101	€260,820,811	€287,752,892
Shares Oustanding	39,390,000	39,390,000	39,390,000	39,390,000	39,390,000
EPS	€3.79	€5.43	€6.00	€6.62	€7.31
Payout Ratio	60%	60%	60%	60%	60%
Dividends Per Share	€2.27	€3.26	€3.60	€3.97	€4.38
Divdend Tax 56.6%	€1.01	€1.45	€1.60	€1.76	€1.95
Reinvest Rate 8%	€1.09	€1.56	€1.73	€1.91	€2.10
P/E 22x	€83.36	€119.57	€132.00	€145.67	€160.71
Total 5Y CAGR	**24.20%**				

Discussion

What makes Melexis' present valuation compelling is that it is –8.61% lower than its close on April 10th, 2015, over ten years ago. *There has never been a longer period of lateral price movement in the company's history.*

At Melexis' current price of €54.35, management's proposed €50MM buyback program would repurchase about one million shares. The last time management purchased a like amount was in 2011. They bought back 923,019 shares on the open market, after shares had been flat for over six years. Like today, the company was operating in conditions where prospective demand was likely to be high.

That year, the price of Melexis shares averaged €11.36. Five years later, on the final trading day of 2016, shares of Melexis had risen by 460%, to €63.65, for a CAGR of 41.15%, excluding dividends.

Whether the latter return repeats over the next five years is unclear, but management's use of excess capital to repurchase shares is a positive sign, especially in light of likely sustained, long-term demand for Melexis' products.

Risks to Ownership

Chinese Invasion of Taiwan

An obvious risk to Melexis is the potential for EU-China sanctions following a Chinese invasion of Taiwan. While conflict risk should be factored into position sizing, management is taking action in a way that could somewhat insulate their Chinese operations from sanctions. Management began outsourcing sensor testing and assembly for China-domestic supply in 2024, and recently announced a partnership with an unnamed Chinese foundry to provide end-to-end production in the region, which is slated to begin in the first half of 2026.

If management can build self-sufficient Chinese production, then Melexis should be able to maintain Chinese operations, similar to how Palfinger has profitably maintained crane production in Russia despite EU sanctions. Direct investment from Melexis' European operations may not be possible to remain sanction-compliant, which is why the establishment of Chinese capacity, alongside the company's recently opened facility in Kuching, Malaysia, serve as favorable insurance should military conflict with Taiwan occur.

IP Theft

The next question is, does China-based assembly and production expose Melexis to intellectual property theft? Potentially, but to reiterate: China's economic interests are not focused on subsidizing small, lagging-edge technology markets; they are focused on leading-edge technology markets, like quantum computing, astronautics, and artificial intelligence. Put differently, Melexis' products are not of strategic value from a military, technology, or security perspective, and they are not a high cost for OEMs.

If anything, the "sophisticated unsophistication" of Melexis' sensors is an

advantage, as even if China does not invade Taiwan militarily, Melexis' lagging-edge focus insulates the company from export risk that leading-edge technology companies like ASML are currently facing.

Key Personnel/Ownership

Marc Biron's comments on education convey a concern about attracting long-term talent to Melexis' ranks. Even though Marc is young, question exists as to who will lead the company as Marc and Melexis' founders age and retire.

As a corollary, Françoise and Roland formerly shared their 50% ownership of Melexis, but recently split it in half. Françoise and Roland are establishing conditions for their children to direct their own investment decisions when they assume control over their respective family offices. This creates long-term uncertainty related to shareholder alignment, although it is difficult to imagine that Françoise and Roland would be satisfied with their children denigrating the quality and proficiency of Melexis while they remain alive and cognizant.

Maiden will continue to monitor shareholder alignment and key personnel risk over the course of Melexis' coverage.

Customer Concentration

Melexis is somewhat exposed to customer concertation risk, with a single customer responsible for 13% of 2024 sales. This was up from 12% in 2023, but down from 18% in 2015.

Given the fact that the automotive industry is fairly concentrated, Melexis' customer base is arguably diverse, and increasingly so. In 2024, Melexis' top ten customers comprised 42% of total sales, which was down from 52% in 2010, and 63.5% in 2004.

Melexis' Top Ten Customer Concentration

in %	2024	2023
Customer A	13 %	12 %
Customer B	6 %	6 %
Customer C	6 %	5 %
Customer D	5 %	4 %
Customer E	2 %	4 %
Customer F	2 %	2 %
Customer G	2 %	2 %
Customer H	2 %	2 %
Customer I	2 %	2 %
Customer J	2 %	2 %
Total	42 %	41 %

Source: Melexis 2024 Annual Report

Declining customer concentration implies that Melexis' largest customer is a European automaker, for while ten-year European growth has remained satisfactory, at 7.8% per year, growth in Asia, led by China, Japan, South Korea, India, and the Philippines, has grown by 14.4% annually over the same period. The math suggests that higher sales contribution from Asian customers would naturally cause Melexis' European customer concentration to moderate over time.

Therefore, customer concentration risk should continue incremental moderation as Asia is set to outgrow Europe for the foreseeable future.

X-Fab Disruption

Melexis is prone to X-Fab disruption and capacity limitations, as the company is Melexis' main supplier of wafers. The catch is that Françoise and Roland also own 49.25% of X-Fab through their family offices, with Françoise owning 24.24%, and Roland owning 25.01%. In other words, Melexis' wafer capacity is only limited by X-Fab's productive capacity, which Melexis' owners have under their thumb; the company's continuation as a customer is all but assured.

To provide some financial information on X-Fab:

- X-Fab is based in Erfurt, Germany, and is publicly traded under the ticker EPA:XFAB
- Melexis accounted for 37.4% of X-Fab's 2023 sales
- X-Fab has increased its revenue by 246% since its 2014 IPO
- EBIT margin has averaged 6.8% since 2014, and 9.11% ex operating losses in 2019 and 2020
- EBIT/interest has declined to 2.2x in the wake of high inventories. However, leverage remains attractive, with debt-to-equity at 41%
- Also, X-Fab holds $US215.8MM in cash on hand, which is enough to cover annual operating expenses for two years without operational cuts

Recession

Recessionary risk is somewhat of an oxymoronic mention, as recessionary contractions are a fact of life for the producers of economically sensitive assets.

It bears repeating that Melexis is cheap; its products are driven by necessary demand; the company is a competitive Meccah; and the business has an excellent balance sheet.

Conclusion

Melexis serves as a reminder that our industry has an incentive to embellish in order to appear more attractive. Melexis used to rightly describe itself as the world's number one producer of automotive magnetic latch & switch and position sensors, but stopped in 2020. Considering Allegro's comparable share of magnetic latch & switch sensors, alongside broad citations of market share from large, non-core competitors, it is plausible that Melexis' management removed disclosure of Melexis' competitive position due to the strenuousness of verification.

It is time consuming to turn over stones one by one, but as with Hingham, unusual long-term economics requires context, and if the procurement of context requires a significant time commitment, then that is what is necessary for an owner-like understanding to be acquired.

As Maiden proceeds with its mission to provide investors with differentiated insight into companies of interest, we will continue to apply unit-level analysis wherever applicable, no matter the work required.

On that note, we had originally planned to publish this report on a different company, but decided to pivot five weeks into analysis due to balance sheet risk. As a result, our research on Melexis' products remains regrettably incomplete, but we believe our findings are sufficient to explain Melexis' operational outperformance.

To recap, our findings showed that Melexis offers a wider and more sophisticated assortment of automotive magnetic latch & switch and position sensors than any other competitor. Its Triaxis sensors lead the automotive three-axis sensor market by a long shot, which are critical for anything that requires 360-degree sensing capability, like ride stability, steer-by-wire, and rotary position. Indeed, it is hard to put a price on reducing the probability of a vehicle hydroplaning, or the risk of suffering steering failure.

As a closing remark, Maiden disposed of its position in CarMax in January of this year. With tech giants like Waymo and Tesla vying to normalize robotaxis, the risk of disruption to single-car ownership created terminal risk that made continued investment in CarMax difficult.

Fortunately, Melexis solves for the prior, as whether a vehicle has a human operator or not, or is purchased at a dealership or not, does not preclude it from requiring hundreds of sensors to function optimally. In the same vein, whether EVs eventually comprise the bulk of the world's vehicle fleet or not is also somewhat irrelevant. Yes, Europe and China are hot to trot on EVs to assist with decarbonization efforts, but however they ultimately achieve that, it is unlikely that vehicle responsiveness and position sensing will diminish in importance.

Signed,
Gwen Hofmeyr