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Infineon Technologies AG
A Comprehensive Analysis of Infineon as a Strong Player in a Growing Semiconductor Industry

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Abstract

This report provides a detailed assessment of Infineon's business model, the semiconductor industry and the company's financial strength. On the basis of our findings, we derive risks and opportunities for Infineon and find the company to be in a strong strategic position to capitalize on growth opportunities in the market, providing the basis for our growth projections and company valuation.

Keywords: Semiconductors, Opportunities, Risks, Economy

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This report is part of the Infineon Technologies AG report (annexed), developed by Alexander Hübner and Camilla Jost and should be read has an integral part of it.

Table of Contents

Introduction

This report is part of a joint report assessing the value of Infineon Technologies AG, both intrinsically and extrinsically, to derive an investment thesis. By incorporating regional growth potential, as well as a holistic and thorough analysis of segment growth drivers and Infineon's potential to capture their growth in the market, we offer a robust projection of Infineon's value.

Based on our findings, we conclude that Infineon is subject to substantial growth opportunities and is well-positioned to capitalize on them in the future. Overall, we consider the company to be currently undervalued, with the current share price of €38.18[1] being significantly lower than our valuation of €48.19/share.

The joint report is structured to provide a comprehensive and robust analysis of Infineon's value. To arrive at a holistic assessment of the company, the report first introduces the company and its most significant business characteristics, which is followed by a thorough assessment of the semiconductor industry, its key value drivers, and the macroeconomic context. Then, we provide an analysis of Infineon's financial position, assessing its income statement and balance sheet strength. Taking its financial position and industry environment into account, we derive specific risks and opportunities used to project future growth of the company. This first part of the joint report comprises a thorough basis for our growth and value projections of Infineon, which are the subject of the second part of the report. Here, we identify specific value drivers from the previously analyzed market trends to specifically and thoroughly forecast revenues based on the company's geographic presence and served segments. This is followed by an operational forecast, projecting costs, and deriving key metrics for the company's valuation. Based on these projections, Infineon is then evaluated using intrinsic valuation (DCF) and extrinsic valuation (trading and transaction multiples) methods. Within the valuation chapter, we are considering our methodology to arrive at key inputs such as WACC and terminal value, followed by a sensitivity and scenario analysis. Lastly, valuation risks will be considered before concluding the report with a buy recommendation to potential investors.

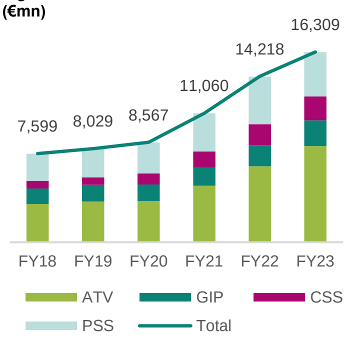
This individual report covers the first part of the joint report, hence the company and industry overview, financial statement analysis, and conclusion based on derived risks and opportunities.

The purpose of the individual report is to provide a holistic understanding of the semiconductor industry and its past performance to derive specific trends and value drivers, combined with an assessment of Infineon's past financial performance. The gained insights are used to project risks and opportunities for the company. This analysis comprises a solid basis for assessing Infineon's intrinsic and extrinsic valuation, as we found the derived value drivers and Infineon's positioning in the market to be crucial in projecting Infineon's future profitability.

[1] Reuters, Share Price as of 19th December 2023

Company Overview

Figure 1: Infineon Revenues FY18 - FY23 (€mn)



Source: Refinitiv Workspace

Infineon Technologies AG is a global semiconductor manufacturing company headquartered in Neubiberg, Germany. The company was founded in April 1999 as a spin-off from Siemens AG and has been listed on the Frankfurt Stock Exchange since March 2000 (ticker symbol: IFX).[2] Its IPO value of $21.26bn was the largest IPO in the technology sector at the time.[3] As of December 2023, Infineon employs 58,600 people worldwide and has generated a revenue of €16.309bn in FY23 ending September 30th, maintaining its position as the largest semiconductor manufacturer in Germany, and second largest in Europe.[2]

Product Overview

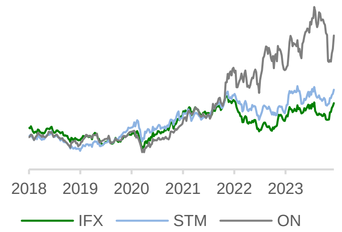
Figure 22: Ownership Structure FY23

Investor Name	% O/S
BlackRock Institutional Trust Company	7.04%
Norges Bank IM	3.05%
DWS Investment GmbH	2.99%
Allianz Global Investors GmbH	2.96%
The Vanguard Group, Inc.	2.91%

Source: Refinitiv Workspace

The company's product portfolio can be summarized into five main product groups as follows. **Microcontrollers,** which are primarily used in a variety of electronic applications such as consumer electronics, automotive control systems, and industrial automation, are a vital part of Infineon's product portfolio. They execute pre-programmed instructions to process inputs from sensors and manage the overall function of an embedded system. Their small size and low power consumption make microcontrollers an essential component in the development of a wide variety of digital solutions. Additionally, Infineon offers **software solutions** to enable customers to program their microcontrollers as needed. Furthermore, the portfolio includes **power semiconductors**, which are electronic devices designed to control and manage the flow of electrical power within electric systems. They play a crucial role in converting and regulating the flow of energy for precise control in applications ranging from consumer electronics to industrial machinery. Hence, they are specifically relevant for Infineon's power sensor systems segment (PSS). **Memory** semiconductors store and retrieve information in digital form. These semiconductors play an essential role in electronic devices and systems by storing data in the form of bits, enabling data processing, storage, and retrieval. They represent a key product for Infineon's connected secure segment (CSS). Lastly, **Sensors** are essential to the company's product portfolio as they play a pivotal role in enhancing the intelligence and functionality of various applications, contributing significantly to the advancement of industries such as automotive, industrial automation, and IoT infrastructure.

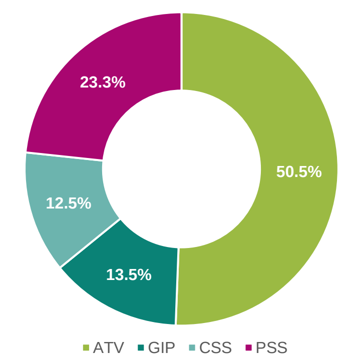
Figure 33: Stock Performance of IFX, STM, ON



Source: Refinitiv Workspace

Business Segments

Figure 4: Revenue Split by Segment (FY23)



Source: Refinitiv Workspace

The major share of Infineon's revenues is generated in its **automotive (ATV)** segment, making this segment a central pillar of the company's operations (Figure 4). With revenues of €8,242mn, the company has achieved a global market share of 16.2% in the global ATV semiconductor market in FY23, making it the market leader in this segment. With its product offering, Infineon covers key applications such as energy control and management, connectivity and infotainment, comfort and ambient electronics, as well as safety and data security for connected vehicles, offering solutions for 70% of all ATV applications in the market.**Error! Bookmark not defined.** In regards to regional distribution, Infineon is currently generating 30% of ATV revenues in both Asia Pacific (incl. Japan) and Europe, followed by 25% in China and 15% in the Americas.[4] The company has achieved market leadership for ATV semiconductor solutions worldwide, being the largest supplier in China and South Korea and is the second-largest supplier in Japan and Europe.

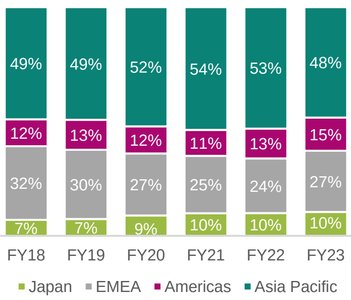
[2] Infineon Annual Report 2023
[3] Wall Street Journal: Infineon's $21.26 Billion Issue Is World's Largest Technology IPO (2000)
[4] Infineon ATV Investor Call 2023

The **Green Industrial Power (GIP)** segment generated €2,205mn in revenue in FY23. Within this segment, Infineon specializes in providing semiconductor solutions for the intelligent management and efficient conversion of electrical energy, specifically used in the generation of renewable industry and industrial applications. Semiconductors in this segment are relevant for the generation, transmission, storage and utilization of electricity. Almost one third of total revenues in this segment are generated from solutions for renewable energy generation, followed by home appliances (17%) and energy infrastructure applications, such as storage solutions (10%).[5]

Within the **Connected Secure Systems (CSS)** business segment, revenues are generated by providing semiconductor solutions for a variety of applications, including connected home appliances, IT equipment, consumer electronics, cloud security, connected vehicles, and payment solutions. Overall, this segment is focused on developing solutions that ensure the security and connectivity of networked systems. Key customers in this segment are large buyers such as Bosch, Lenovo, Microsoft, Nintendo, Brother and more. Current revenues in the CSS segment are mainly generated from consumer electronics and connectivity solutions such as cellular infrastructure, which made up roughly 80% of CSS revenues in FY22. The remaining revenues stem mainly from payment solutions and ID security.[6] In FY23, €2,046mn revenues were generated in the CSS segment, providing 12.6% of group revenues.

The **Power Sensor Systems (PSS)** segment contributed 23% (€3,798mn) of group revenues in FY23. The focus of this segment is on providing technologies such as power semiconductors and sensors based on silicon (Si), silicon carbide (SiC), and gallium nitride (GaN), used in applications such as 5G infrastructure, data centers, power supplies and adapters, battery-powered devices, renewable energy and more. Within this segment, Infineon has established itself as a leader in the global Si MOSFET (semiconductors primarily used for conductivity control) market. Main customers in this segment include Continental, Samsung, Bose, Jabra, Amazon, Facebook, Sony, Google, and Xiaomi.

Figure 5 5: Regional Revenue Split FY18 - FY23



Source: Refinitiv Workspace

Geographical Presence

Geographically, Infineon's revenues can be divided into five major regions, namely **EMEA**, **Americas, Japan**, **Asia Pacific, and China**. Whilst Japan has been considered independently from the Asian Pacific region since FY04 due to the market's size and significance to group revenues, China has only recently been considered separately in the company's statements (since FY20). The development of revenue shares generated in each region can be seen in Figure 5**Error! Reference source not found.**. As China has only been considered individually from Asia Pacific since FY20, we have combined their revenues in the figure for better comparability.

Mergers and Acquisitions

Figure 66: M&A Activity FY15 - FY23

Year	EUR (mn)	# Deals
2023	778	4
2022	2	3
2021	0	2
2020	9,330	1
2019	467	3
2018	13	2
2017	880	3
2016	0	1
2015	1,702	3
Total	**13,171**	**22**

Source: Refinitiv Workspace

Infineon's growth strategy complements its organic growth in each of the segments with **inorganic growth** through acquisitions, either strengthening the company's key operations or acting as an enabler to diversify into new technologies and capture growth opportunities.[7] Over the past few years, Infineon has made substantial M&A investments, such as the acquisition of **Cypress** for €9.33bn in FY20,[8] being the largest deal made by the company in the past 10 years.**Error! Bookmark not defined.** In line with this strategy, Cypress had shown particular

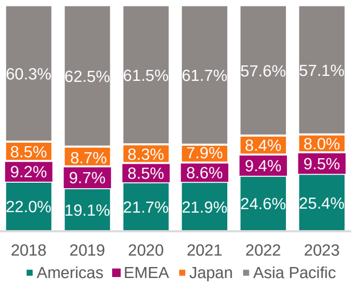
[5] Infineon GIP Call at PCIM 2023
[6] Infineon CSS Division Call 2022
[7] Infineon Group Strategy 2023
[8] Reuters: Chipmaker Infineon ready to spend billions on acquisitions (2023)

strength in its connectivity components, microcontrollers and software solutions. Through the acquisition, Infineon was able to successfully increase revenue growth in the ATV segment by strengthening its portfolio for connectivity semiconductors, which are increasing in importance in the ATV semiconductor market. Overall, Infineon has completed 22 acquisitions since FY14, comprising a total deal value of €13,171mn (Figure 6).

Industry Overview

Geographic Segmentation

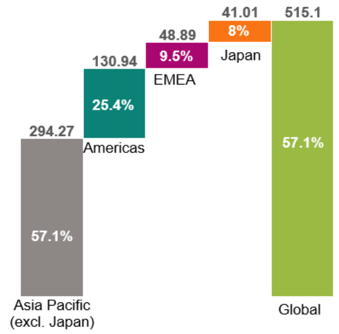
Figure 7: Revenue Share by Region FY18-FY23



Overall, the geographical distribution between the considered regions has been fairly stable over the past five years (Figure 7). The revenue decrease of market share of the Asian Pacific market by 3.2% and a 0.5% decrease in Japan has been mainly captured by the Americas, increasing revenue share by 3.4% since FY18. The remaining 0.3% market share has been captured by the EMEA region, leading to regional revenues presented in Figure 8.

Past Industry Performance and Main Influences

Figure 8: Industry Revenues by Region (FY23)



Source: WTST Global Semiconductor Billings

Revenue growth in the semiconductor industry is subject to cyclicality due to a high dependence on the global economy, high average production lead time, and a quickly changing technological environment. After a period of substantial growth ($CAGR_{16-18}$ of 17.6%), the semiconductor industry experienced a 12.0% decrease in revenues in 2019. Two major influences were causing this downturn: Firstly, the market suffered from the ongoing **US-China trade war**, hence impacting the supply chains of two of the major regions for semiconductor production.[9] Secondly, after strong growth in 2017 of 21.6%, the industry experienced an oversupply in semiconductors, starting in the second half of 2018, significantly decreasing prices in 2019 (a reduction of 5.3% of the import price index (IPI) for semiconductors).[10] Once recovered, the **pandemic** affected the industry in 2020 and 2021, as digitalization was accelerated through an increase in demand for digital solutions such as consumer electronics (i.e., global mobile communication demand grew on average by 26.7%, revenues from smart home systems by 19.2%).[11] The rapid increase in demand caused a **chip shortage**, coupled with an increase in raw material prices such as aluminum (+ 45%), copper (+ 51%), and silicon (+ 52%), driving semiconductor prices further up (2.4% increase in producer price index (PPI), 4.9% increase in IPI). During 2021, market growth accelerated to 26.2%, largely driven by the post-pandemic increase in the ATV market of 19.7%. Underlining the adverse effects of long lead times in production and high dependence on the global economy is following the downturn of revenue growth in 2022. With a higher-than-expected demand increase by the end of 2021, 2022 started with another chip shortage, further increasing their prices (PPI for semiconductors increasing by 3.9%, IPI increasing by 2.4%). However, with **inflation** rising from 4.7% in 2021 to 8.7% in 2022 due to continuing lockdowns in China as well as the **war in Ukraine**, the global economy further slowed down, decreasing demand in almost all segments of semiconductor revenues, but especially consumer spending on electronics (i.e., revenues in the global smartphone market decreased by 5.7%, global revenues from consumer electronics by 4.3%). As these macroeconomic factors have persisted, the industry has seen a sharp 10.3% decrease in revenues from $574.08bn to $515.1bn in 2023.

Figure 97: Competitors by Market Share

Company	Market Share
TSMC	13.0%
Intel	10.3%
Samsung	13.1%
Micron	12.4%
Broadcom	7.0%
Qualcomm	7.0%
Nvidia	5.2%
SK Hynix	4.3%
Texas Instruments	3.5%
Infineon	**3.4%**

Source: Refinitiv Workspace

Cyclicality in the industry is high due to long lead times and slow adjustments to demand fluctuations

Overall, industry dynamics can be summarized as cyclical, as with an average lead time in

[9] Market Line: Global Semiconductor Report 2023
[10] IBIS World: Global Semiconductor & Electronic Parts Manufacturing (2023)
[11] Statista, 2023

production of 25.5 weeks, adapting supply to unexpected demand changes is difficult.[12] This leads to chip oversupply/shortage, resulting in decreases/increases in prices and therefore influencing market size growth.

Key Trends and Macroeconomic Influences

Decarbonization

Increasing demand for clean energy sources is largely driving demand for semiconductors. At the core of this transformative journey is the growing demand for **photovoltaic (PV)** solutions. In 2023 alone, investment in solar PV surpassed $320bn, strengthening its position as the globally leading solution for renewable energy generation.[13] Semiconductor companies provide crucial components such as microcontrollers, sensors, and power management semiconductors required for the transition and storage of generated energy. The global growth of newly installed solar power capacity ($CAGR_{18-23}$: 27.2%) positions semiconductor companies focused on PV applications as key players in a growing market, elevating their attractiveness to investors who seek growth opportunities that harmonize with sustainability.[14] Also driven by decarbonization efforts is the expansion of **wind power (WP) capacity**. Wind generators depend heavily on power semiconductor solutions and sensors. With governments and corporations directing substantial investment to wind power projects, totaling $185bn in 2023, semiconductor companies providing solutions for wind power generation are witnessing rising demand of a $CAGR_{18-23}$ of 11.3% in annually installed wind power capacity.[15] Overall, the market for renewable energies has seen significant growth in the past and is expected to continue growing strongly in the future (PV $CAGR_{23-29}$: 15.7%, WP $CAGR_{23-29}$: 7.1%). Another effect of decarbonization efforts is the increasing shift from demand for vehicles using fossil fuel to **electric vehicles (EVs)**. The demand for EVs is partially accelerated by governments subsidizing EV purchases, artificially accelerating growth in demand. For example, EV subsidy programs in the US and Canada have been found to increase sales by up to 5-7%.[16] Over the past five years alone, global revenues from sales of EVs have grown with a $CAGR_{18-23}$ of 37.8%, experiencing an accelerated growth of 99.9% in 2021 after the global economy had recovered from the pandemic. Based on industry forecasts, we are expecting global semiconductor revenues from EVs to continue growing at a $CAGR_{23-29}$ of 10.0%. For the last 10 years, revenues from semiconductors for the ATV industry have consistently made up around 9-11% of global semiconductor revenues, which we expect to stay consistent based on available industry outlooks.[17] Considering both past and anticipated growth of renewable energy capacity and the market for EVs, we consider decarbonization to be a major driver of revenue growth in the semiconductor industry for the considered period of 2023 to 2029. This concludes that being well positioned in the ATV segment as well as the GIP segment of the industry poses a significant opportunity for companies such as Infineon to experience strong revenue growth in the future.

Digitalization

Digitalization has experienced accelerated growth fueled by the pandemic, with a sudden increase in demand for digitalized solutions to enable a mobile workforce, digital educational systems, individual connectivity, and other aspects of life. Even though demand for such products

[12] Market Line: Global Semiconductor Report 2032
[13] International Energy Agency – Solar PV (2023)
[14] Statista, 2023
[15] International Energy Agency – Wind (2023)
[16] Electric vehicle subsidies: Time to accelerate or pump the brakes? (2023)
[17] World Semiconductor Trade Statistics (WTST): Global Semiconductor Billings Report

Efficient inventory management and lead time offer a competitive advantage in navigating through periods of chip shortage & oversupply

has drastically declined in 2023 due to increasing inflation and decreasing growth of GDP, we consider this to be a temporary development with demand being expected to accelerate again in the short- to medium-term. Since the increasing relevance of smartphones and mobile communications, semiconductors have played a crucial role in our **communicative infrastructure**. In recent years however, new technologies have emerged that are accelerating the demand for semiconductors once again, such as cashless and contactless **payment solutions**, **connectivity** and **safety systems** in cars, **autonomous driving**, and the increasing importance of **data computing** capacities. Considering smartphones and other consumer electronics, even though yearly global smartphone unit sales have declined since 2018, they are expected to experience a strong increase ($CAGR_{23-29}$ of 12.3%), accompanying the recovery of the global economy. As of 2019, global connectivity has experienced accelerated growth through the rolling out of **5G infrastructure**. As semiconductors are vital for this technology, we consider this to gain relevance for future revenue growth in the market. Since first introduced, global 5G subscriptions have increased by 843.5% from 158mn in 2020 to 1.48bn global subscriptions in 2023, with most developed countries currently adopting the technology.

To summarize, as the world is becoming increasingly connected, semiconductor companies require the ability to quickly adapt to changes in the technological environment and capture growth opportunities that stem from new technologies to successfully compete in the market. However, with unexpected changes in demand, especially within the area of digitalization, flexibility to adjust supply through a reduction in lead time and improvements in inventory management are crucial for the effective capitalization of these opportunities.

- Macroeconomic Influences

Diversification between digitalization & decarbonization is key to mitigate dependency on global economic events

Whilst decarbonization and digitalization offer major growth opportunities, demand in the industry is by its nature inherently dependent on the health of the global economy, holding especially true for demand within the area of digitalization. Hence, economic factors such as **inflation and GDP growth** can have drastic influences on the industry. The dependence on macroeconomic factors is a considerable factor in the market's cyclicality. In an industry in which lead time is as high as 25.5 weeks on average, and flexibility to adjust supply to unexpected demand changes is low, this can pose a significant risk to semiconductor suppliers. In times of economic downturn, the industry is often experiencing an oversupply in chips which in turn leads to a decline in prices as in 2019. In line with this is the 1.1% decline in PPI and 2.9% decline in IPI of semiconductors in 2023, caused by decreased consumer spending and decreased investment in renewable energies due to the effects of geopolitical events such as the increase in energy costs due to the war in Ukraine. As oversupply in the industry is often followed by a period of increasing demand with the recovery of the economy causing an undersupply of chips, prices are prone to increase again, which eventually leads to a strong increase in semiconductor revenue growth. The cyclical nature of the industry poses a challenge for all companies, however, especially for those which are experiencing struggles to efficiently plan their inventories and dynamically adjust their supply. For those companies, periods of oversupply often lead to high expenses due to write-offs of inventory and high idle cost in production.

To conclude, semiconductor manufacturers are facing major growth opportunities in the industry. It is highly critical to be strongly positioned to capture those growth opportunities and diversify revenue streams between decarbonization and digitalization. By diversifying between those streams, companies can better navigate through the cyclical industry environment. Additionally, the ability to efficiently manage inventories and decrease lead time enables companies to adjust more dynamically to changes in demand.

Financial Statement Analysis

Income Statement

- Revenues

Figure 108: Selected Peer Group 1 and 2

Group	#	Company
Group 2 / Group 1	1	STMicroelectronics NV
Group 2 / Group 1	2	ON Semiconductor Corp
Group 2 / Group 1	3	NXP Semiconductors NV
Group 2 / Group 1	4	Renesas Electronics Corp
Group 2 / Group 1	5	Microchip Technology Inc
Group 2	6	Rohm Co Ltd
Group 2	7	Marvell Technology Inc
Group 2	8	Qualcomm Inc
Group 2	9	Micron Technology Inc
Group 2	10	Analog Devices Inc

Selected based on similarity in industries, business model, and financial metrics

Over the past 5 years, Infineon has been able to grow its revenues by 115% from €7,599mn in FY18 to €16,309mn in FY23, implying a CAGR$_{18-23}$ of 11.9%. After experiencing a 7.6% revenue growth in FY18, growth declined during FY19 and FY20 due to the adverse effects of chip oversupply in 2019 and the pandemic in 2020. The decline in global demand for ATV solutions in 2020 decreased revenue growth from 6.7% in FY19 to 1.1% in FY20 in the company's ATV segment, which made up 41.3% of total revenues. However, Infineon was still able to generate a stable revenue growth of 6.7% in that year, especially driven by the CSS segment which grew by 48%, capturing the overall accelerating effect the pandemic had on digitalization and therefore on revenues. In FY21, accelerated digitalization resulted in continuously high revenue growth rates in the CSS segment (47%) and the PSS segment (23%). Additionally, after having recovered from low demand in FY20, Infineon was able to increase ATV revenues by 37% and GIP revenue by 10%. However, this growth cannot solely be attributed to developments in the market, but rather to inorganic company growth due to the Cypress acquisition, which was mainly captured by these two segments and first showed full effect in FY21.

Infineon continuously outperforms market growth since FY20 by strongly capitalizing on growth opportunities

In FY21, Infineon outperformed the market growth of 5.8% by growing group revenues by 29.1%. This strong growth indicates Infineon's ability to successfully implement its M&A strategy of using strategic acquisitions to strengthen its core business and position in the market, quickly integrating Cypress into its business and generating additional revenues. During FY22, Infineon was not able to uphold the strong growth previously experienced in the CSS segment, decreasing its growth rate from 47% to 30% in FY22. This was mainly due to the industry environment in 2022 analyzed in the industry overview, leading to a steep increase in consumer prices that decreased demand, especially in applications relevant to the CSS segment. However, Infineon was able to fully exploit the 13.4% revenue growth in the global ATV semiconductor market and outperformed the ATV market with a 35% growth in the segment during FY22. This underlines Infineon's position as the market leader in the ATV semiconductor market and the company's ability to fully capture its growth opportunities. Furthermore, the GIP segment experienced a push in demand due to the increase in demand for renewable energy elaborated in the industry overview. In total, Infineon's revenues grew by 28.6% to €14.2bn in FY22, again outperforming the semiconductor market which grew by 3.3%. Lastly, as elaborated in the analysis of past industry performance, the market experienced several challenges in FY23 that decreased market size by 4.3%, leading to a decrease of Infineon's revenues in the PSS segment of 7%. This, however, was offset by the continuous high revenue growth in the ATV and GIP segments, growing by 26% and 23% respectively. In FY23, Infineon was able to again outperform the market with a revenue growth of 14.7% compared to a decrease in the overall semiconductor market size of 10.3%. The stable and resilient growth in revenues underlines the validity of projecting continuous revenue growth for Infineon in the future.

- Cost Structure

Infineon's **operating margin** has increased from 19% in FY18 to 24% in FY23, implying a reduction of 5% in the company's operating expenses. This is driven by the 7.5% decrease in cost of revenues, and a 1.4% decrease in SG&A expenses during this period. There has been a minor increase of 0.7% in **cost of revenues** in FY19 which we found to be partially due to the increase of raw material prices (6% increase in average semiconductor raw material prices)[18] and underutilization of manufacturing capacity in the second half of the year, leading to an increase in idle costs and therefore keeping cost of revenues high.[19] In FY20, the increase in raw material prices continued with an average increase of 11% in semiconductor raw material prices, alongside the further increase of idle costs due to the continued low demand for semiconductors, increasing the cost of revenues by 54bp to 68.1% in FY20. However, since FY21, Infineon has been able to continuously reduce its cost of revenues due to the decline in idle cost (manufacturing capacity could be fully utilized due to demand exceeding supply)[20] and a decrease in raw material prices of 5% in FY22 and 17% in FY23.**Error! Bookmark not defined.** In FY23, the effect of decreased raw material prices was slightly offset by increased idle costs due to the slowed demand growth. Nevertheless, Infineon has been able to reduce its cost of revenues to 53% in FY23, corresponding to a gross margin of 47%. When compared to its peers, the cost increases due to macroeconomic events in FY19 and FY20 have been more significant for Infineon than its competitors, which on average, have been able to maintain relatively more robust gross margins throughout this period. However, Infineon was able to recover and improve its gross margin by 16.9% from FY21 to FY23. While outperforming its most similar competitor, STMicroelectronics, which had a gross margin of 32.55% in FY23,[21] Infineon still remains below other companies in Peer Group 1 & 2, in which we found a median gross margin of 53.5% and 50.5%, respectively. Therefore, Infineon has not yet been able to reduce its cost of revenues as effectively as its competitors, indicating a lower operating efficiency. This is underlined when considering Infineon's operating margin: during FY19 and FY20, there has been an increase in both **SG&A expenses** and **R&D expenses**, attributable to the acquisition of Cypress, as the sudden increase in employees from 4,682 (FY19) to 6,111 (FY20) within SG&A, and an increase from 7,755 to 9,262 employees in R&D, resulted in an increase in operating expenses from 18.6% of revenues in FY18 to 25.1% of revenues in FY20, before growth effects on revenues could be generated. Since FY21, Infineon was able to decrease the operating expenses as a share of revenues consistently to 21.2%, generating an **operating margin** of 24.2% in FY23. Considering its position in comparison to peer companies, Infineon incurs higher operating expenses, generating a lower operating margin. In FY23, we found Peer Group 1 to have an average operating margin of 30.9%, whilst the median gross margin of Peer Group 2 was at 26.9%. Hence, Infineon is incurring higher costs on each euro of revenues and is less efficient in turning its revenues into profits. However, the company has been able to achieve operating margins closer to those of its peers over the past three years by overall improving its cost management to improve its profitability position in the industry.

Infineon has a slightly lower operating efficiency than its peers

The resulting net income grew with a $CAGR_{18\text{-}23}$ of 20.2%, indicating a strong and stable growth in this period. Compared to its peers, Infineon generates a lower **net profit margin** than Peer Group 1 as well as the median of 21.1% (median chosen due to outliers) of Peer Group 2 in FY23, which is in line with the company's relative position in gross and operating margin. Concluding from the analysis of Infineon's income statement, the company has proven the ability to grow its revenues throughout challenging conditions and has overall been able to improve its cost

[18] IMF Primary Commodity Price System, 2023
[19] Infineon Annual Report 2022
[20] Infineon Annual Report 2023
[21] Refinitiv Workspace

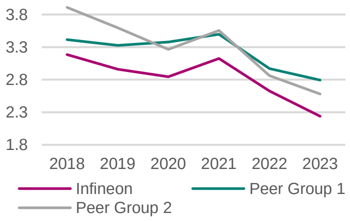
efficiency over the past five years, with improvement in gross, operating, and net profit margin. However, it has not yet been able to decrease costs to successfully compete with its peers in this aspect, resulting in a lower relative operating efficiency.

Balance Sheet

- Assets

From FY18 to FY23, Infineon's current and non-current assets grew with CAGRs of 14.5% and 26.6%, respectively, with total assets growing at a $CAGR_{18\text{-}23}$ of 21.1% from €10,878mn €24,439mn. Over the past 5 years, Infineon's **quick and current ratios** have significantly decreased. While in FY18 the quick ratio was 1.81 and well within the peer averages of 1.19 (Peer Group 1) and 1.92 (Peer Group 2), it has since decreased to its current level of 1.12, falling below the average of Peer Group 1 (1.45) and Peer Group 2 (1.76). The company's current ratio has decreased accordingly from 2.49 in FY18 to 1.89 in FY23. Except for FY19, the decline in both ratios has been continuous. The increase in FY19 is attributable to the increase in cash & short-term investments from €2,543mn to €3,779mn, mainly caused by an increase in ordinary share capital to finance the acquisition of Cypress expansion and the expansion of its manufacturing capacity in Kulim (Malaysia). In FY20, the quick ratio decreased from 2.62 to 1.49 and the current ratio decreased from 3.39 to 2.08, both mainly attributable to increases in LT debt for financing activities. This indicates a decline in the company's short-term liquidity position. Falling below its industry peers signifies potential difficulties in meeting immediate financial obligations. However, whilst facing a decrease in liquidity, both ratios have consistently been larger than one, concluding Infineon's ability to cover its short-term obligations with its readily available assets.

Figure 11: Infineon's and Peer Groups' Inventory Turnover

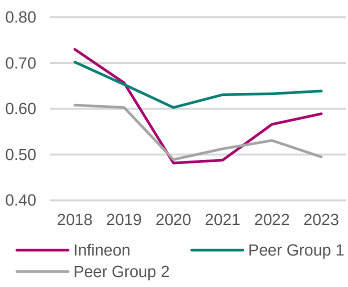


Source: Refinitiv and own computations

Relatively lower inventory turnover poses a risk when considering the cyclicality of demand in the industry

Infineon's **inventory turnover** has consistently been below Peer Group 1 & 2 in the past 5 years, clearly indicating a less efficient use of, and a lesser ability to generate revenue from its inventories. While having improved its inventory turnover from 2.84 in FY20 to 3.12 in FY21, it has since decreased to 2.63 in FY22 and 2.24 in FY23. We have found the decrease in inventory turnover to be caused by an increase in inventory post-pandemic due to high expected demand, which was unexpectedly followed by the 7% decrease in PSS revenues and a slower-than-expected growth in the CSS segment. This has caused excess inventories and decreased the company's ability to generate revenues from its inventory. However, Infineon's peer companies have experienced a similar decline in inventory turnover, from an average in Peer Group 1 of 3.5 in FY21 to 2.8 in FY23 (decrease of 0.71) and 3.6 in FY21 to 2.6 (decrease of 0.97) in FY23 in Peer Group 2. Hence, the effect on Infineon's inventory turnover (decrease of 0.78) is less significant than the average decrease in inventory turnover of its peers.

Figure 1210: Infineon's & Peer Groups' RoA



Source: Refinitiv and own computations

From FY18 to FY23, Infineon's **asset turnover** has significantly decreased from 0.73 to 0.59. While the financing activities for the Cypress acquisition increased assets by 38.2% in FY19, significantly more than the growth in revenues, asset turnover decreased from 0.73 to 0.66. For FY20, the Cypress acquisition caused a significant increase in non-current assets (143.4%) especially through goodwill, increasing from €909mn to €5,897mn, causing an additional decrease in asset turnover to 0.48 in FY20. Since FY21, asset turnover continuously improved to its current level of 0.59 in FY23 and Infineon has been able to increase its asset turnover to outperform Peer Group 1's average of 0.49, however staying below average asset turnover of 0.64 in Peer Group 2. Overall, we consider Infineon's ability to generate revenue from its assets to be within the peer average, currently generating €0.59 of revenue per € of its assets. However,

While we found asset turnover to be in line with peer performance, Infineon has consistently generated lower RoA than its peers

in line with our findings from Infineon's income statement considering its below-peer average operating efficiency and ability to generate profits from its revenues, Infineon's **RoA** has consistently been below that of its peers since FY20. We have found RoA to be at 11.04%, whilst the average RoA of Peer Group 1 is at 15.4% and 12.93% for Peer Group 2.

- Liabilities

Infineon relies less heavily on debt than most its competitors, with both low LT debt/capital and D/E ratios

Infineon's current liabilities have grown by 21% from €2,182mn in FY18 to €5,669mn in FY23, in line with its non-current liabilities growing by 20.5% from €2,251mn €5,726mn in FY23. Considering current liabilities, DPO of Infineon's trade accounts payable have increased significantly from 71 in FY19 to 96 in FY23. Being able to extend payment terms and hence improving payment terms with its suppliers enables Infineon to hold on to cash for an extended time, which is a strategic advantage in the cyclical semiconductor industry. This suggests that Infineon has stable and strong relationships with its suppliers and a certain degree of bargaining power. Non-current liabilities have increased mainly due to LT debt that was issued in FY20 as a financing activity for the acquisition of Cypress. Since then, Infineon consistently reduced LT debt levels from €6,763mn in FY20 to €4,712mn in FY23. This is reflected in the company's **LT debt-to-capital** ratio which increased from 0.15 in FY19 to 0.40 in FY20, and its **D/E** ratio which increased from 0.57 in FY19 to 1.15 in FY20. Both ratios have since decreased, resulting in an LT debt-to-capital ratio of 0.22 and a D/E ratio of 0.67. When compared to Peer Group 1, Infineon's D/E ratio has consistently been lower than the group average, except for FY20 (financing of Cypress acquisition), while LT debt-to-capital ratio has stayed significantly below the peer average throughout the entire period under consideration, with an LT debt-to-capital ratio of 0.22 compared to the Group 1 average of 0.39, and a D/E ratio of 0.67 compared to the average of Group 1 of 0.77 in FY23. When considering Group 2 however, Infineon's D/E ratio has been consistently higher than the Group's median, as companies in this group had especially low D/E ratios during this period (i.e., in FY23 D/E was 0.06 for Rohm Co., 0.18 for Analog Devices, 0.29 for Marvell Technologies).

- Shareholders' Equity

Low RoE is in line with overall low operational efficiency based on low relative operating, gross, and net margin and RoA

Equity has, next to retained earnings, grown through the issuance of 55.24mn shares in FY20, coupled with the issuance of hybrid bonds amounting to €1,203mn (part of the financing activities for acquiring Cypress). Overall, equity has increased by 21.5% from €6,446mn in FY18 to €17,044mn in FY23. We have considered the company's **RoE**$_{18\text{-}23}$ and compared the metric to competitors in both peer groups. In FY18, Infineon had a RoE of 18.9%, which was below the median of Group 1 (20.1%), but higher than the median of 16.6% of Peer Group 2. Whilst in FY19 RoE decreased significantly for both peer groups (median for Peer Group 1: 6.6%, median for Peer Group 2: 6.7%), Infineon experienced a significant, but less drastic decrease in RoE to 10.3%. In FY20 however, medians for both peer groups slightly recovered, whilst Infineon's RoE further decreased to 3.6%. This was due to the significant decrease in net income during the period of chip oversupply in FY19 and the adverse effects of the pandemic in FY20. Since FY21, both peer groups have increased their RoE, with the median RoE of Peer Group 1 being 35.3% and the median for Peer Group 2 being 33.7% in FY23. Hence, the median RoE for Peer Group 1 increased by an overall 15.17pp and the median for Peer Group 2 increased by 17.14pp over the past five years. Infineon however was not able to increase its RoE during the period, instead decreasing RoE by 0.48pp to 18.4%, falling well below its peers in FY23. This is in line with the company's other efficiency metrics being below average of peers.

To conclude, Infineon struggled to regain momentum after the decrease in RoE in FY19 and FY20, despite the recovery in return on equity for the benchmark groups, falling far below peer medians. This trend aligns with the company's overall efficiency metrics, indicating the need for strategic measures to improve operational efficiency and profitability. In summary, Infineon has shown considerable growth in its assets, however with a declining trend in liquidity ratios, potentially posing challenges in meeting short-term obligations. Effective liability management is evident through extended payment terms, while a favorable debt structure positions Infineon strongly within its peer group. Despite equity growth, struggling to improve RoE indicates the need for strategic measures to improve operational efficiency and profitability.

Risks and Opportunities

Weaknesses and Risks

Whilst Infineon's D/E ratio has been in line with industry averages over the past five years, the company has continuously decreased its reliance on debt financing since FY20. While this poses certain opportunities, low debt financing decreases Infineon's ability to exploit tax advantages that could be beneficial to the company's profitability in the future. Additionally, the historically low inventory turnover rates prove Infineon to be less efficient in generating sales from its inventories. As the industry is cyclical, low inventory turnover poses a risk for Infineon, increasing write-offs significantly during periods of decreased demand. Even with improvements in inventory planning through incorporating technological advances in their new manufacturing facilities, we do not expect Infineon to increase inventory turnover drastically enough to achieve a strong competitive position in this regard, based on the company's past performance in inventory management. Overall, we have found Infineon to have a lower operating efficiency than its peers, generating lower gross, operating, and net profit margins, overall dampening the projected potential profitability of the company.

Increased dependency on the Chinese market and the ATV segment could mitigate the anticipated robust growth in case of geopolitical and macroeconomic challenges

As Infineon is the ATV market leader and hence highly focused on this segment (ATV segment revenues grew from 43.2% to 50.5% of total revenues by FY23), we are expecting the share of total revenues generated from this segment to continue growing significantly over the next years. As assessed in the competitive analysis, this segment is subject to increasing competition with many companies shifting focus to it. Hence, generating an increasing share of revenues from this segment decreases Infineon's diversification and partially mitigates its ability to react to changes in the macroeconomic environment, as well as leading to Infineon being potentially subject to an increasingly competitive industry environment. Furthermore, with the largest share of Infineon's revenues being generated in China, combined with the high growth of the ATV segment in this region, the company is highly dependent on this specific market. However, we have seen in past and current geopolitical environments that this dependence can become a risk for Infineon, i.e., through the increased effort by the Chinese government to increase domestic semiconductor production and decrease semiconductor imports.

Strengths and Opportunities

While inheriting some degree of risk, the ATV segment also creates a major growth opportunity for Infineon, as it is projected to experience exceptional growth within the semiconductor industry. Being the market leader in this segment with a current market share of 16.7%, we find Infineon to inherit a strong position to capitalize on this growth opportunity. We project Infineon's robust position in the Chinese ATV semiconductor market to significantly contribute to its global market share and revenue growth. Additionally, the strategic acquisition and successful integration of Cypress have enhanced Infineon's performance in this segment, further solidifying its market resilience.

Investing €5bn for both the expansion of manufacturing capacity in Dresden and Kulim, Infineon prepares for the expected surge in demand growth in the industry

While holding this strong position in the ATV semiconductor market, we have seen that Infineon is well-diversified between the trends of decarbonization and digitalization, enabling the company to navigate through a challenging macroeconomic environment. This diversification in applicational areas increases the company’s ability to react to demand fluctuations within its segments, which are likely to continue occurring due to the cyclicality of the semiconductor industry. This enabled Infineon to continuously generate revenue growth in the past, which we are expecting to hold for the future. This resilience is to be considered when projecting the company’s performance for the coming years. Additionally, Infineon is currently preparing for strong growth in the industry by expanding its manufacturing capacities, especially in Dresden (Germany) and Kulim (Malaysia). Hence, the company is taking measures to increase supply capacities according to its position in high-growth segments of the industry, preparing for the projected growth in demand for its products. Furthermore, the successful integration of Cypress into the company’s operations substantiates the company’s ability to generate accelerated growth in revenues from the acquisition, underlining Infineon’s successful implementation of its strategy of incorporating inorganic growth. Taking these factors into consideration, we conclude Infineon to be well-positioned to capitalize on global market growth.

Infineon’s strategic positioning in high growth markets and the ability to continuously generate positive operating cash flows strengthen our growth projections

Over the past 10 years, Infineon has consistently and without exception been able to generate positive operating cash flows, proving the company’s ability to generate sufficient cash from operating activities to cover its operational expenses. Taking this into account, we are confident to assume that positive cash flows from operating activities will persist in the future, underlining Infineon’s growth potential and financial stability. Based on these findings, we project Infineon to be able to capitalize on growth opportunities and exhibit close-to-market or over-market revenue growth in the future. Hence, we expect that the strong growth in revenues will partially offset the relatively lower operating efficiency. Additionally, we project a continued ability to successfully mitigate industry risks such as cyclicality, creating an investment opportunity for investors who are looking for growth in harmony with sustainability.

INFINEON TECHNOLOGIES AG

COMPANY REPORT

HARDWARE & SOFTWARE

19 DECEMBER 2023

ALEXANDER HÜBNER, CAMILLA JOST

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Powering the Future

Digital Excellence in a Sustainable World

- Based on our holistic assessment of Infineon's value considering intrinsic and extrinsic valuation methods, we derive a **BUY** recommendation for investors. Our projected target price of **€48.73** implies an increase of €10.53 (**27.6% upside potential**) to the current share price

- We consider Infineon to be strongly positioned within the market to capitalize on its **high growth potential**, driven by continuous global digitalization and increasing decarbonization efforts

- We have found projected growth for the **automotive semiconductor** market to be especially strong. As Infineon is the **market leader** in this segment, we are confident that the company will be able to fully exploit this growth opportunity, further accelerating Infineon's revenue growth

- The semiconductor market's high dependency on the global economy, coupled with high average production lead times lead to the **cyclicality** of the industry. This poses a certain degree of **risk** to our revenue projections due to unforeseeable macroeconomic influences

Company description

Infineon Technologies AG is a German manufacturer for semiconductors that was founded in 1999 and has since become a global provider for semiconductor solutions in the automotive, industrial power, connected security systems and power sensor segments. The company is the largest semiconductor manufacturer in Germany and market leader in the ATV semiconductor market.

Recommendation:	**BUY**
Price Target FY24:	**48.73 €**
Price (as of 29-Feb-24)	**38.20 €**

Reuters: 38.18, Bloomberg: 38.20

52-week range (€)	27.09-40.24
Market Cap (€m)	49,886.18
Outstanding Shares (m)	1,305.92

Source: Refinitiv Workspace

Source: Yahoo Finance

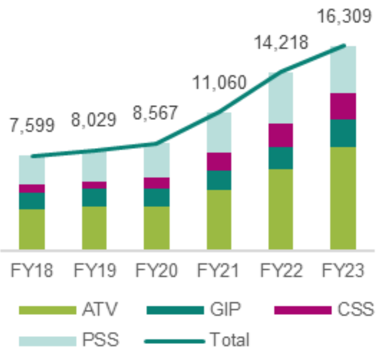
(Values in € millions)	2022	2023	2024F
Revenues	14,208	16,309	18,386
EBITDA	4,533	5,622	5,849
Net Profit	2,186	3,139	3,313
EV/Sales	2.25	2.6	2.8
EV/EBITDA	7.06	7.46	7.5
ROIC	0.19	0.23	0.19
P/E	13.72	13.17	15.1
EPS	1.65	2.38	2.51

Source: Refinitiv and own projections

Table of Contents

Company Overview

Figure 1: Infineon Revenues FY18 - FY23 (€mn)



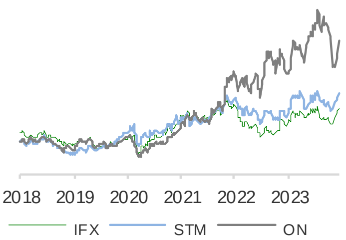
Source: Refinitiv Workspace

Figure 2: Ownership Structure FY23

Investor Name	% O/S
BlackRock Institutional Trust Company	*7.04%*
Norges Bank IM	*3.05%*
DWS Investment GmbH	*2.99%*
Allianz Global Investors GmbH	*2.96%*
The Vanguard Group, Inc.	*2.91%*

Source: Refinitiv Workspace

Figure 3: Stock Performance of IFX, STM, ON



Source: Refinitiv Workspace

Infineon Technologies AG is a global semiconductor manufacturing company headquartered in Neubiberg, Germany. The company was founded in April 1999 as a spin-off from Siemens AG and has been listed on the Frankfurt Stock Exchange since March 2000 (ticker symbol: IFX).[1] Its IPO value of $21.26bn was the largest IPO in the technology sector at the time.[2] As of December 2023, Infineon employs 58,600 people worldwide and has generated a revenue of €16.309bn in FY23 ending September 30th, maintaining its position as the largest semiconductor manufacturer in Germany, and second largest in Europe.[1]

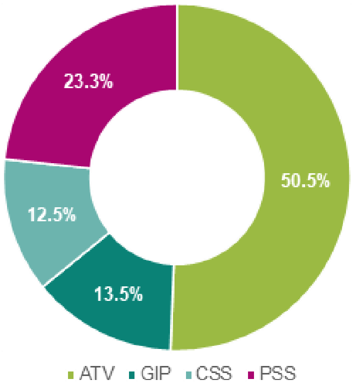
Product Overview

The company's product portfolio can be summarized into five main product groups as follows. **Microcontrollers,** which are primarily used in a variety of electronic applications such as consumer electronics, automotive control systems, and industrial automation, are a vital part of Infineon's product portfolio. They execute pre-programmed instructions to process inputs from sensors and manage the overall function of an embedded system. Their small size and low power consumption make microcontrollers an essential component in the development of a wide variety of digital solutions. Additionally, Infineon offers **software solutions** to enable customers to program their microcontrollers as needed. Furthermore, the portfolio includes **power semiconductors**, which are electronic devices designed to control and manage the flow of electrical power within electric systems. They play a crucial role in converting and regulating the flow of energy for precise control in applications ranging from consumer electronics to industrial machinery. Hence, they are specifically relevant for Infineon's power sensor systems segment (PSS). **Memory** semiconductors store and retrieve information in digital form. These semiconductors play an essential role in electronic devices and systems by storing data in the form of bits, enabling data processing, storage, and retrieval. They represent a key product for Infineon's connected secure segment (CSS). Lastly, **Sensors** are essential to the company's product portfolio as they play a pivotal role in enhancing the intelligence and functionality of various applications, contributing significantly to the advancement of industries such as automotive, industrial automation, and IoT infrastructure.

[1] Infineon Annual Report 2023
[2] Wall Street Journal: Infineon's $21.26 Billion Issue Is World's Largest Technology IPO (2000)

Business Segments

Figure 4: Revenue Split by Segment (FY23)



Source: Refinitiv Workspace

The major share of Infineon's revenues is generated in its **automotive (ATV)** segment, making this segment a central pillar of the company's operations (Figure 4). With revenues of €8,242mn, the company has achieved a global market share of 16.2% in the global ATV semiconductor market in FY23, making it the market leader in this segment. With its product offering, Infineon covers key applications such as energy control and management, connectivity and infotainment, comfort and ambient electronics, as well as safety and data security for connected vehicles, offering solutions for 70% of all ATV applications in the market (Figure 4) In regards to regional distribution, Infineon is currently generating 30% of ATV revenues in both Asia Pacific (incl. Japan) and Europe, followed by 25% in China and 15% in the Americas.[3] The company has achieved market leadership for ATV semiconductor solutions worldwide, being the largest supplier in China and South Korea and is the second-largest supplier in Japan and Europe.

The **Green Industrial Power (GIP)** segment generated €2,205mn in revenue in FY23. Within this segment, Infineon specializes in providing semiconductor solutions for the intelligent management and efficient conversion of electrical energy, specifically used in the generation of renewable industry and industrial applications. Semiconductors in this segment are relevant for the generation, transmission, storage and utilization of electricity. Almost one third of total revenues in this segment are generated from solutions for renewable energy generation, followed by home appliances (17%) and energy infrastructure applications, such as storage solutions (10%).[4]

Within the **Connected Secure Systems (CSS)** business segment, revenues are generated by providing semiconductor solutions for a variety of applications, including connected home appliances, IT equipment, consumer electronics, cloud security, connected vehicles, and payment solutions. Overall, this segment is focused on developing solutions that ensure the security and connectivity of networked systems. Key customers in this segment are large buyers such as Bosch, Lenovo, Microsoft, Nintendo, Brother and more. Current revenues in the CSS segment are mainly generated from consumer electronics and connectivity solutions such as cellular infrastructure, which made up roughly 80% of CSS revenues in FY22. The remaining revenues stem mainly from payment solutions

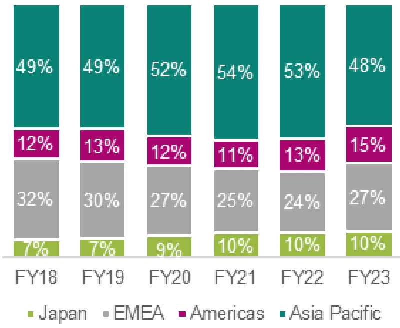
[3] Infineon ATV Investor Call 2023
[4] Infineon GIP Call at PCIM 2023

and ID security.[5] In FY23, €2,046mn revenues were generated in the CSS segment, providing 12.6% of group revenues.

The **Power Sensor Systems (PSS)** segment contributed 23% (€3,798mn) of group revenues in FY23. The focus of this segment is on providing technologies such as power semiconductors and sensors based on silicon (Si), silicon carbide (SiC), and gallium nitride (GaN), used in applications such as 5G infrastructure, data centers, power supplies and adapters, battery-powered devices, renewable energy and more. Within this segment, Infineon has established itself as a leader in the global Si MOSFET (semiconductors primarily used for conductivity control) market. Main customers in this segment include Continental, Samsung, Bose, Jabra, Amazon, Facebook, Sony, Google, and Xiaomi.

Geographical Presence

Figure 5: Regional Revenue Split FY18 - FY23



Source: Refinitiv Workspace

Geographically, Infineon's revenues can be divided into five major regions, namely **EMEA**, **Americas, Japan**, **Asia Pacific, and China**. Whilst Japan has been considered independently from the Asian Pacific region since FY04 due to the market's size and significance to group revenues, China has only recently been considered separately in the company's statements (since FY20). The development of revenue shares generated in each region can be seen in Figure 5. As China has only been considered individually from Asia Pacific since FY20, we have combined their revenues in the figure for better comparability.

Mergers and Acquisitions

Figure 6: M&A Activity FY15 - FY23

Year	EUR (mn)	# Deals
2023	778	4
2022	2	3
2021	0	2
2020	9,330	1
2019	467	3
2018	13	2
2017	880	3
2016	0	1
2015	1,702	3
Total	**13,171**	**22**

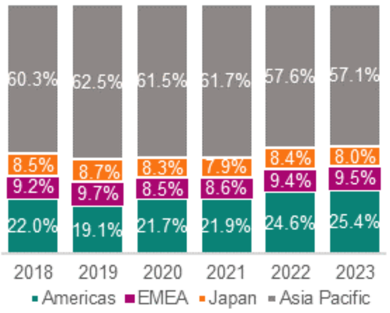
Source: Refinitiv Workspace

Infineon's growth strategy complements its organic growth in each of the segments with **inorganic growth** through acquisitions, either strengthening the company's key operations or acting as an enabler to diversify into new technologies and capture growth opportunities.[6] Over the past few years, Infineon has made substantial M&A investments, such as the acquisition of **Cypress** for €9.33bn in FY20,[7] being the largest deal made by the company in the past 10 years. In line with this strategy, Cypress had shown particular strength in its connectivity components, microcontrollers and software solutions. Through the acquisition, Infineon was able to successfully increase revenue growth in the ATV segment by strengthening its portfolio for connectivity semiconductors, which are increasing in importance in the ATV semiconductor market. Overall, Infineon has completed 22 acquisitions since FY14, comprising a total deal value of €13,171mn (Figure 6).

Industry Overview

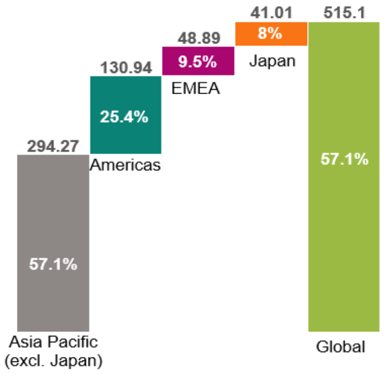
[5] Infineon CSS Division Call 2022
[6] Infineon Group Strategy 2023
[7] Reuters: Chipmaker Infineon ready to spend billions on acquisitions (2023)

Figure 7: Revenue Share by Region FY18-FY23



Source: WTST Global Semiconductor Billings

Figure 8: Industry Revenues by Region (FY23)



Source: WTST Global Semiconductor Billings

Figure 9: Competitors by Market Share

Company	Market Share
TSMC	13.0%
Intel	10.3%
Samsung	13.1%
Micron	12.4%
Broadcom	7.0%
Qualcomm	7.0%
Nvidia	5.2%
SK Hynix	4.3%
Texas Instruments	3.5%
Infineon	**3.4%**

Source: Refinitiv Workspace

Cyclicality in the industry is high due to long lead times and slow adjustments to demand fluctuations

Geographic Segmentation

Overall, the geographical distribution between the considered regions has been fairly stable over the past five years (Figure 7). The revenue decrease of market share of the Asian Pacific market by 3.2% and a 0.5% decrease in Japan has been mainly captured by the Americas, increasing revenue share by 3.4% since FY18. The remaining 0.3% market share has been captured by the EMEA region, leading to regional revenues presented in Figure 8.

Past Industry Performance and Main Influences

Revenue growth in the semiconductor industry is subject to cyclicality due to a high dependence on the global economy, high average production lead time, and a quickly changing technological environment. After a period of substantial growth ($CAGR_{16\text{-}18}$ of 17.6%), the semiconductor industry experienced a 12.0% decrease in revenues in 2019. Two major influences were causing this downturn: Firstly, the market suffered from the ongoing **US-China trade war**, hence impacting the supply chains of two of the major regions for semiconductor production.[8] Secondly, after strong growth in 2017 of 21.6%, the industry experienced an oversupply in semiconductors, starting in the second half of 2018, significantly decreasing prices in 2019 (a reduction of 5.3% of the import price index (IPI) for semiconductors).[9] Once recovered, the **pandemic** affected the industry in 2020 and 2021, as digitalization was accelerated through an increase in demand for digital solutions such as consumer electronics (i.e., global mobile communication demand grew on average by 26.7%, revenues from smart home systems by 19.2%).[10] The rapid increase in demand caused a **chip shortage**, coupled with an increase in raw material prices such as aluminum (+ 45%), copper (+ 51%), and silicon (+ 52%), driving semiconductor prices further up (2.4% increase in producer price index (PPI), 4.9% increase in IPI). During 2021, market growth accelerated to 26.2%, largely driven by the post-pandemic increase in the ATV market of 19.7%. Underlining the adverse effects of long lead times in production and high dependence on the global economy is following the downturn of revenue growth in 2022. With a higher-than-expected demand increase by the end of 2021, 2022 started with another chip shortage, further increasing their prices (PPI for semiconductors increasing by 3.9%, IPI increasing by 2.4%). However, with **inflation** rising from 4.7% in 2021 to 8.7% in 2022 due to continuing lockdowns in China as well as the **war in Ukraine**, the global economy further slowed down, decreasing demand in almost all segments of semiconductor revenues, but especially consumer spending on electronics

[8] Market Line: Global Semiconductor Report 2023
[9] IBIS World: Global Semiconductor & Electronic Parts Manufacturing (2023)
[10] Statista, 2023

(i.e., revenues in the global smartphone market decreased by 5.7%, global revenues from consumer electronics by 4.3%). As these macroeconomic factors have persisted, the industry has seen a sharp 10.3% decrease in revenues from $574.08bn to $515.1bn in 2023.

Overall, industry dynamics can be summarized as cyclical, as with an average lead time in production of 25.5 weeks, adapting supply to unexpected demand changes is difficult.[11] This leads to chip oversupply/shortage, resulting in decreases/increases in prices and therefore influencing market size growth.

Key Trends and Macroeconomic Influences

- ### Decarbonization

Increasing demand for clean energy sources is largely driving demand for semiconductors. At the core of this transformative journey is the growing demand for **photovoltaic (PV)** solutions. In 2023 alone, investment in solar PV surpassed $320bn, strengthening its position as the globally leading solution for renewable energy generation.[12] Semiconductor companies provide crucial components such as microcontrollers, sensors, and power management semiconductors required for the transition and storage of generated energy. The global growth of newly installed solar power capacity ($CAGR_{18\text{-}23}$: 27.2%) positions semiconductor companies focused on PV applications as key players in a growing market, elevating their attractiveness to investors who seek growth opportunities that harmonize with sustainability.[13] Also driven by decarbonization efforts is the expansion of **wind power (WP) capacity**. Wind generators depend heavily on power semiconductor solutions and sensors. With governments and corporations directing substantial investment to wind power projects, totaling $185bn in 2023, semiconductor companies providing solutions for wind power generation are witnessing rising demand of a $CAGR_{18\text{-}23}$ of 11.3% in annually installed wind power capacity.[14] Overall, the market for renewable energies has seen significant growth in the past and is expected to continue growing strongly in the future (PV $CAGR_{23\text{-}29}$: 15.7%, WP $CAGR_{23\text{-}29}$: 7.1%). Another effect of decarbonization efforts is the increasing shift from demand for vehicles using fossil fuel to **electric vehicles (EVs)**. The demand for EVs is partially accelerated by governments subsidizing EV purchases, artificially accelerating growth in demand. For example, EV subsidy programs in the US and Canada have been found to increase sales by up to 5-7%.[15] Over the past five years alone, global revenues from sales of EVs have grown with a $CAGR_{18\text{-}23}$ of 37.8%, experiencing an

[11] Market Line: Global Semiconductor Report 2032
[12] International Energy Agency – Solar PV (2023)
[13] Statista, 2023
[14] International Energy Agency – Wind (2023)
[15] Electric vehicle subsidies: Time to accelerate or pump the brakes? (2023)

accelerated growth of 99.9% in 2021 after the global economy had recovered from the pandemic. Based on industry forecasts, we are expecting global semiconductor revenues from EVs to continue growing at a $CAGR_{23-29}$ of 10.0%. For the last 10 years, revenues from semiconductors for the ATV industry have consistently made up around 9-11% of global semiconductor revenues, which we expect to stay consistent based on available industry outlooks.[16] Considering both past and anticipated growth of renewable energy capacity and the market for EVs, we consider decarbonization to be a major driver of revenue growth in the semiconductor industry for the considered period of 2023 to 2029. This concludes that being well positioned in the ATV segment as well as the GIP segment of the industry poses a significant opportunity for companies such as Infineon to experience strong revenue growth in the future.

- Digitalization

Digitalization has experienced accelerated growth fueled by the pandemic, with a sudden increase in demand for digitalized solutions to enable a mobile workforce, digital educational systems, individual connectivity, and other aspects of life. Even though demand for such products has drastically declined in 2023 due to increasing inflation and decreasing growth of GDP, we consider this to be a temporary development with demand being expected to accelerate again in the short- to medium-term. Since the increasing relevance of smartphones and mobile communications, semiconductors have played a crucial role in our **communicative infrastructure**. In recent years however, new technologies have emerged that are accelerating the demand for semiconductors once again, such as cashless and contactless **payment solutions**, **connectivity** and **safety systems** in cars, **autonomous driving**, and the increasing importance of **data computing** capacities. Considering smartphones and other consumer electronics, even though yearly global smartphone unit sales have declined since 2018, they are expected to experience a strong increase ($CAGR_{23-29}$ of 12.3%), accompanying the recovery of the global economy. As of 2019, global connectivity has experienced accelerated growth through the rolling out of **5G infrastructure**. As semiconductors are vital for this technology, we consider this to gain relevance for future revenue growth in the market. Since first introduced, global 5G subscriptions have increased by 843.5% from 158mn in 2020 to 1.48bn global subscriptions in 2023, with most developed countries currently adopting the technology.

Efficient inventory management and lead time offer a competitive advantage in navigating through periods of chip shortage & oversupply

To summarize, as the world is becoming increasingly connected, semiconductor companies require the ability to quickly adapt to changes in the technological

[16] World Semiconductor Trade Statistics (WTST): Global Semiconductor Billings Report

environment and capture growth opportunities that stem from new technologies to successfully compete in the market. However, with unexpected changes in demand, especially within the area of digitalization, flexibility to adjust supply through a reduction in lead time and improvements in inventory management are crucial for the effective capitalization of these opportunities.

- Macroeconomic Influences

Diversification between digitalization & decarbonization is key to mitigate dependency on global economic events

Whilst decarbonization and digitalization offer major growth opportunities, demand in the industry is by its nature inherently dependent on the health of the global economy, holding especially true for demand within the area of digitalization. Hence, economic factors such as **inflation and GDP growth** can have drastic influences on the industry. The dependence on macroeconomic factors is a considerable factor in the market's cyclicality. In an industry in which lead time is as high as 25.5 weeks on average, and flexibility to adjust supply to unexpected demand changes is low, this can pose a significant risk to semiconductor suppliers. In times of economic downturn, the industry is often experiencing an oversupply in chips which in turn leads to a decline in prices as in 2019. In line with this is the 1.1% decline in PPI and 2.9% decline in IPI of semiconductors in 2023, caused by decreased consumer spending and decreased investment in renewable energies due to the effects of geopolitical events such as the increase in energy costs due to the war in Ukraine. As oversupply in the industry is often followed by a period of increasing demand with the recovery of the economy causing an undersupply of chips, prices are prone to increase again, which eventually leads to a strong increase in semiconductor revenue growth. The cyclical nature of the industry poses a challenge for all companies, however, especially for those which are experiencing struggles to efficiently plan their inventories and dynamically adjust their supply. For those companies, periods of oversupply often lead to high expenses due to write-offs of inventory and high idle cost in production.

To conclude, semiconductor manufacturers are facing major growth opportunities in the industry. It is highly critical to be strongly positioned to capture those growth opportunities and diversify revenue streams between decarbonization and digitalization. By diversifying between those streams, companies can better navigate through the cyclical industry environment. Additionally, the ability to efficiently manage inventories and decrease lead time enables companies to adjust more dynamically to changes in demand.

Financial Statement Analysis

Income Statement

▪ Revenues

Figure 10: Selected Peer Group 1 and 2

Group	#	Company
Group 2 / Group 1	1	STMicroelectronics NV
Group 2 / Group 1	2	ON Semiconductor Corp
Group 2 / Group 1	3	NXP Semiconductors NV
Group 2 / Group 1	4	Renesas Electronics Corp
Group 2 / Group 1	5	Microchip Technology Inc
Group 2	6	Rohm Co Ltd
Group 2	7	Marvell Technology Inc
Group 2	8	Qualcomm Inc
Group 2	9	Micron Technology Inc
Group 2	10	Analog Devices Inc

Selected based on similarity in industries, business model, and financial metrics

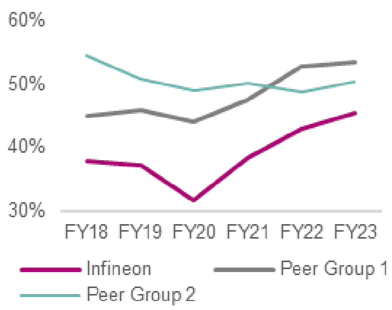
Over the past 5 years, Infineon has been able to grow its revenues by 115% from €7,599mn in FY18 to €16,309mn in FY23, implying a $CAGR_{18\text{-}23}$ of 11.9%. After experiencing a 7.6% revenue growth in FY18, growth declined during FY19 and FY20 due to the adverse effects of chip oversupply in 2019 and the pandemic in 2020. The decline in global demand for ATV solutions in 2020 decreased revenue growth from 6.7% in FY19 to 1.1% in FY20 in the company's ATV segment, which made up 41.3% of total revenues. However, Infineon was still able to generate a stable revenue growth of 6.7% in that year, especially driven by the CSS segment which grew by 48%, capturing the overall accelerating effect the pandemic had on digitalization and therefore on revenues. In FY21, accelerated digitalization resulted in continuously high revenue growth rates in the CSS segment (47%) and the PSS segment (23%). Additionally, after having recovered from low demand in FY20, Infineon was able to increase ATV revenues by 37% and GIP revenue by 10%. However, this growth cannot solely be attributed to developments in the market, but rather to inorganic company growth due to the Cypress acquisition, which was mainly captured by these two segments and first showed full effect in FY21. In FY21, Infineon outperformed the market growth of 5.8% by growing group revenues by 29.1%. This strong growth indicates Infineon's ability to successfully implement its M&A strategy of using strategic acquisitions to strengthen its core business and position in the market, quickly integrating Cypress into its business and generating additional revenues.

Infineon continuously outperforms market growth since FY20 by strongly capitalizing on growth opportunities

During FY22, Infineon was not able to uphold the strong growth previously experienced in the CSS segment, decreasing its growth rate from 47% to 30% in FY22. This was mainly due to the industry environment in 2022 analyzed in the industry overview, leading to a steep increase in consumer prices that decreased demand, especially in applications relevant to the CSS segment. However, Infineon was able to fully exploit the 13.4% revenue growth in the global ATV semiconductor market and outperformed the ATV market with a 35% growth in the segment during FY22. This underlines Infineon's position as the market leader in the ATV semiconductor market and the company's ability to fully capture its growth opportunities. Furthermore, the GIP segment experienced a push in demand due to the increase in demand for renewable energy elaborated in the industry overview. In total, Infineon's revenues grew by 28.6% to €14.2bn in FY22, again outperforming the semiconductor market which grew by 3.3%. Lastly, as elaborated in the analysis of past industry performance, the market experienced several challenges in FY23 that decreased market size by 4.3%, leading to a decrease of Infineon's revenues in the PSS segment of 7%. This, however, was offset by the continuous high revenue growth in the ATV and GIP segments, growing by 26% and 23% respectively. In FY23, Infineon was able to again outperform the market with a revenue growth of 14.7% compared to a decrease in the overall semiconductor market size of 10.3%. The stable and resilient growth in revenues underlines the validity of projecting continuous revenue growth for Infineon in the future.

- Cost Structure

Figure 11: Gross Margins Infineon, PG 1 & 2 FY18-FY23



Source: Refinitiv Workspace

Infineon's **operating margin** has increased from 19% in FY18 to 24% in FY23, implying a reduction of 5% in the company's operating expenses. This is driven by the 7.5% decrease in cost of revenues, and a 1.4% decrease in SG&A expenses during this period. There has been a minor increase of 0.7% in **cost of revenues** in FY19 which we found to be partially due to the increase of raw material prices (6% increase in average semiconductor raw material prices)[17] and underutilization of manufacturing capacity in the second half of the year, leading to an increase in idle costs and therefore keeping cost of revenues high.[18] In FY20, the increase in raw material prices continued with an average increase of 11% in semiconductor raw material prices, alongside the further increase of idle costs due to the continued low demand for semiconductors, increasing the cost of revenues by 54bp to 68.1% in FY20. However, since FY21, Infineon has been able to continuously reduce its cost of revenues due to the decline in idle cost (manufacturing capacity could be fully utilized due to demand exceeding supply)[19] and a decrease in raw material prices of 5% in FY22 and 17% in FY23. In FY23, the effect of decreased raw material prices was slightly offset by increased idle costs due to the slowed demand growth. Nevertheless, Infineon has been able to reduce its cost of revenues to 53% in FY23, corresponding to a gross margin of 47%. When compared to its peers, the cost increases due to macroeconomic events in FY19 and FY20 have been more significant for Infineon than its competitors, which on average, have been able to maintain relatively more robust gross margins throughout this period. However, Infineon was able to recover and improve its gross margin by 16.9% from FY21 to FY23. While outperforming its most similar competitor, STMicroelectronics, which had a gross margin of 32.55% in FY23,[20] Infineon still remains below other companies in Peer Group 1 & 2, in which we found a median gross margin of 53.5% and 50.5%, respectively. Therefore, Infineon has not yet been able to reduce its cost of revenues as effectively as its competitors, indicating a lower

Infineon is less efficient in management of its costs than its selected peers

[17] IMF Primary Commodity Price System, 2023
[18] Infineon Annual Report 2022
[19] Infineon Annual Report 2023
[20] Refinitiv Workspace

Infineon has a slightly lower operating efficiency than its peers

operating efficiency. This is underlined when considering Infineon's operating margin: during FY19 and FY20, there has been an increase in both **SG&A expenses** and **R&D expenses**, attributable to the acquisition of Cypress, as the sudden increase in employees from 4,682 (FY19) to 6,111 (FY20) within SG&A, and an increase from 7,755 to 9,262 employees in R&D, resulted in an increase in operating expenses from 18.6% of revenues in FY18 to 25.1% of revenues in FY20, before growth effects on revenues could be generated. Since FY21, Infineon was able to decrease the operating expenses as a share of revenues consistently to 21.2%, generating an **operating margin** of 24.2% in FY23. Considering its position in comparison to peer companies, Infineon incurs higher operating expenses, generating a lower operating margin. In FY23, we found Peer Group 1 to have an average operating margin of 30.9%, whilst the median gross margin of Peer Group 2 was at 26.9%. Hence, Infineon is incurring higher costs on each euro of revenues and is less efficient in turning its revenues into profits. However, the company has been able to achieve operating margins closer to those of its peers over the past three years by overall improving its cost management to improve its profitability position in the industry. The resulting **net income** grew with a $CAGR_{18\text{-}23}$ of 20.2%, indicating a strong and stable growth in this period. Compared to its peers, Infineon generates a lower **net profit margin** than Peer Group 1 as well as the median of 21.1% (median chosen due to outliers) of Peer Group 2 in FY23, which is in line with the company's relative position in gross and operating margin. Concluding from the analysis of Infineon's income statement, the company has proven the ability to grow its revenues throughout challenging conditions and has overall been able to improve its cost efficiency over the past five years, with improvement in gross, operating, and net profit margin. However, it has not yet been able to decrease costs to successfully compete with its peers in this aspect, resulting in a lower relative operating efficiency.

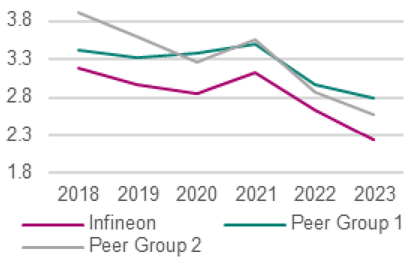
Balance Sheet

- ### Assets

From FY18 to FY23, Infineon's current and non-current assets grew with CAGRs of 14.5% and 26.6%, respectively, with total assets growing at a $CAGR_{18\text{-}23}$ of 21.1% from €10,878mn €24,439mn. Over the past 5 years, Infineon's **quick and current ratios** have significantly decreased. While in FY18 the quick ratio was 1.81 and well within the peer averages of 1.19 (Peer Group 1) and 1.92 (Peer Group 2), it has since decreased to its current level of 1.12, falling below the average of Peer Group 1 (1.45) and Peer Group 2 (1.76). The company's current ratio has decreased accordingly from 2.49 in FY18 to 1.89 in FY23. Except for

FY19, the decline in both ratios has been continuous. The increase in FY19 is attributable to the increase in cash & short-term investments from €2,543mn to €3,779mn, mainly caused by an increase in ordinary share capital to finance the acquisition of Cypress expansion and the expansion of its manufacturing capacity in Kulim (Malaysia). In FY20, the quick ratio decreased from 2.62 to 1.49 and the current ratio decreased from 3.39 to 2.08, both mainly attributable to increases in LT debt for financing activities. This indicates a decline in the company's short-term liquidity position. Falling below its industry peers signifies potential difficulties in meeting immediate financial obligations. However, whilst facing a decrease in liquidity, both ratios have consistently been larger than one, concluding Infineon's ability to cover its short-term obligations with its readily available assets.

Figure 12: Infineon's and Peer Groups' Inventory Turnover

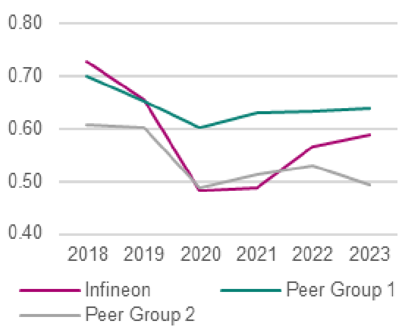


Source: Refinitiv and own computations

Infineon's **inventory turnover** has consistently been below Peer Group 1 & 2 in the past 5 years, clearly indicating a less efficient use of, and a lesser ability to generate revenue from its inventories. While having improved its inventory turnover from 2.84 in FY20 to 3.12 in FY21, it has since decreased to 2.63 in FY22 and 2.24 in FY23. We have found the decrease in inventory turnover to be caused by an increase in inventory post-pandemic due to high expected demand, which was unexpectedly followed by the 7% decrease in PSS revenues and a slower-than-expected growth in the CSS segment. This has caused excess inventories and decreased the company's ability to generate revenues from its inventory. However, Infineon's peer companies have experienced a similar decline in inventory turnover, from an average in Peer Group 1 of 3.5 in FY21 to 2.8 in FY23 (decrease of 0.71) and 3.6 in FY21 to 2.6 (decrease of 0.97) in FY23 in Peer Group 2. Hence, the effect on Infineon's inventory turnover (decrease of 0.78) is less significant than the average decrease in inventory turnover of its peers.

Relatively lower inventory turnover poses a risk when considering the cyclicality of demand in the industry

Figure 13: Infineon's & Peer Groups' RoA



Source: Refinitiv and own computations

From FY18 to FY23, Infineon's **asset turnover** has significantly decreased from 0.73 to 0.59. While the financing activities for the Cypress acquisition increased assets by 38.2% in FY19, significantly more than the growth in revenues, asset turnover decreased from 0.73 to 0.66. For FY20, the Cypress acquisition caused a significant increase in non-current assets (143.4%) especially through goodwill, increasing from €909mn to €5,897mn, causing an additional decrease in asset turnover to 0.48 in FY20. Since FY21, asset turnover continuously improved to its current level of 0.59 in FY23 and Infineon has been able to increase its asset turnover to outperform Peer Group 1's average of 0.49, however staying below average asset turnover of 0.64 in Peer Group 2. Overall, we consider Infineon's ability to generate revenue from its assets to be within the peer average, currently generating €0.59 of revenue per € of its assets. However, in line with

While we found asset turnover to be in line with peer performance, Infineon has consistently generated lower RoA than its peers

our findings from Infineon's income statement considering its below-peer average operating efficiency and ability to generate profits from its revenues, Infineon's **RoA** has consistently been below that of its peers since FY20. We have found RoA to be at 11.04%, whilst the average RoA of Peer Group 1 is at 15.4% and 12.93% for Peer Group 2.

- Liabilities

Infineon relies less heavily on debt than most its competitors, with both low LT debt/capital and D/E ratios

Infineon's current liabilities have grown by 21% from €2,182mn in FY18 to €5,669mn in FY23, in line with its non-current liabilities growing by 20.5% from €2,251mn €5,726mn in FY23. Considering current liabilities, DPO of Infineon's trade accounts payable have increased significantly from 71 in FY19 to 96 in FY23. Being able to extend payment terms and hence improving payment terms with its suppliers enables Infineon to hold on to cash for an extended time, which is a strategic advantage in the cyclical semiconductor industry. This suggests that Infineon has stable and strong relationships with its suppliers and a certain degree of bargaining power. Non-current liabilities have increased mainly due to LT debt that was issued in FY20 as a financing activity for the acquisition of Cypress. Since then, Infineon consistently reduced LT debt levels from €6,763mn in FY20 to €4,712mn in FY23. This is reflected in the company's **LT debt-to-capital** ratio which increased from 0.15 in FY19 to 0.40 in FY20, and its **D/E** ratio which increased from 0.57 in FY19 to 1.15 in FY20. Both ratios have since decreased, resulting in an LT debt-to-capital ratio of 0.22 and a D/E ratio of 0.67. When compared to Peer Group 1, Infineon's D/E ratio has consistently been lower than the group average, except for FY20 (financing of Cypress acquisition), while LT debt-to-capital ratio has stayed significantly below the peer average throughout the entire period under consideration, with an LT debt-to-capital ratio of 0.22 compared to the Group 1 average of 0.39, and a D/E ratio of 0.67 compared to the average of Group 1 of 0.77 in FY23. When considering Group 2 however, Infineon's D/E ratio has been consistently higher than the Group's median, as companies in this group had especially low D/E ratios during this period (i.e., in FY23 D/E was 0.06 for Rohm Co., 0.18 for Analog Devices, 0.29 for Marvell Technologies).

- Shareholders' Equity

Equity has, next to retained earnings, grown through the issuance of 55.24mn shares in FY20, coupled with the issuance of hybrid bonds amounting to €1,203mn (part of the financing activities for acquiring Cypress). Overall, equity has increased by 21.5% from €6,446mn in FY18 to €17,044mn in FY23. We have considered the company's **RoE**$_{18\text{-}23}$ and compared the metric to competitors in both peer groups. In FY18, Infineon had a RoE of 18.9%, which was below the median of Group 1 (20.1%), but higher than the median of 16.6% of Peer Group 2. Whilst in FY19 RoE decreased significantly for both peer groups (median for Peer Group 1: 6.6%, median for Peer Group 2: 6.7%), Infineon experienced a significant, but less drastic decrease in RoE to 10.3%. In FY20 however, medians for both peer groups slightly recovered, whilst Infineon's RoE further decreased to 3.6%. This was due to the significant decrease in net income during the period of chip oversupply in FY19 and the adverse effects of the pandemic in FY20. Since FY21, both peer groups have increased their RoE, with the median RoE of Peer Group 1 being 35.3% and the median for Peer Group 2 being 33.7% in FY23. Hence, the median RoE for Peer Group 1 increased by an overall 15.17pp and the median for Peer Group 2 increased by 17.14pp over the past five years. Infineon however was not able to increase its RoE during the period, instead decreasing RoE by 0.48pp to 18.4%, falling well below its peers in FY23. This is in line with the company's other efficiency metrics being below average of peers.

We found growth in equity to be mainly attributable to RE and financing activities for the acquisition of Cypress

To conclude, Infineon struggled to regain momentum after the decrease in RoE in FY19 and FY20, despite the recovery in return on equity for the benchmark groups, falling far below peer medians. This trend aligns with the company's overall efficiency metrics, indicating the need for strategic measures to improve operational efficiency and profitability. In summary, Infineon has shown considerable growth in its assets, however with a declining trend in liquidity ratios, potentially posing challenges in meeting short-term obligations. Effective liability management is evident through extended payment terms, while a favorable debt structure positions Infineon strongly within its peer group. Despite equity growth, struggling to improve RoE indicates the need for strategic measures to improve operational efficiency and profitability.

Risks and Opportunities

Weaknesses and Risks

Whilst Infineon's D/E ratio has been in line with industry averages over the past five years, the company has continuously decreased its reliance on debt financing since FY20. While this poses certain opportunities, low debt financing decreases Infineon's ability to exploit tax advantages that could be beneficial to the company's profitability in the future. Additionally, the historically low inventory turnover rates prove Infineon to be less efficient in generating sales from its inventories. As the industry is cyclical, low inventory turnover poses a risk for Infineon, increasing write-offs significantly during periods of decreased demand. Even with improvements in inventory planning through incorporating technological advances in their new manufacturing facilities, we do not expect

Infineon to increase inventory turnover drastically enough to achieve a strong competitive position in this regard, based on the company's past performance in inventory management. Overall, we have found Infineon to have a lower operating efficiency than its peers, generating lower gross, operating, and net profit margins, overall dampening the projected potential profitability of the company.

Increased dependency on the Chinese market and the ATV segment could mitigate the anticipated robust growth in case of geopolitical and macroeconomic challenges

As Infineon is the ATV market leader and hence highly focused on this segment (ATV segment revenues grew from 43.2% to 50.5% of total revenues by FY23), we are expecting the share of total revenues generated from this segment to continue growing significantly over the next years. As assessed in the competitive analysis, this segment is subject to increasing competition with many companies shifting focus to it. Hence, generating an increasing share of revenues from this segment decreases Infineon's diversification and partially mitigates its ability to react to changes in the macroeconomic environment, as well as leading to Infineon being potentially subject to an increasingly competitive industry environment. Furthermore, with the largest share of Infineon's revenues being generated in China, combined with the high growth of the ATV segment in this region, the company is highly dependent on this specific market. However, we have seen in past and current geopolitical environments that this dependence can become a risk for Infineon, i.e., through the increased effort by the Chinese government to increase domestic semiconductor production and decrease semiconductor imports.

Strengths and Opportunities

Investing €5bn for both the expansion of manufacturing capacity in Dresden and Kulim, Infineon prepares for the expected surge in demand growth in the industry

While inheriting some degree of risk, the ATV segment also creates a major growth opportunity for Infineon, as it is projected to experience exceptional growth within the semiconductor industry. Being the market leader in this segment with a current market share of 16.7%, we find Infineon to inherit a strong position to capitalize on this growth opportunity. We project Infineon's robust position in the Chinese ATV semiconductor market to significantly contribute to its global market share and revenue growth. Additionally, the strategic acquisition and successful integration of Cypress have enhanced Infineon's performance in this segment, further solidifying its market resilience.

While holding this strong position in the ATV semiconductor market, we have seen that Infineon is well-diversified between the trends of decarbonization and digitalization, enabling the company to navigate through a challenging macroeconomic environment. This diversification in applicational areas increases the company's ability to react to demand fluctuations within its segments, which are likely to continue occurring due to the cyclicality of the semiconductor industry. This enabled Infineon to continuously generate revenue growth in the past, which we are expecting to hold for the future. This resilience is to be considered when projecting the company's performance for the coming years. Additionally, Infineon is currently preparing for strong growth in the industry by expanding its manufacturing capacities, especially in Dresden (Germany) and Kulim (Malaysia). Hence, the company is taking measures to increase supply capacities according to its position in high-growth segments of the industry, preparing for the projected growth in demand for its products. Furthermore, the successful integration of Cypress into the company's operations substantiates the company's ability to generate accelerated growth in revenues from the acquisition, underlining Infineon's successful implementation of its strategy of incorporating inorganic growth. Taking these factors into consideration, we conclude Infineon to be well-positioned to capitalize on global market growth.

Over the past 10 years, Infineon has consistently and without exception been able to generate positive operating cash flows, proving the company's ability to generate sufficient cash from operating activities to cover its operational expenses. Taking this into account, we are confident to assume that positive cash flows from operating activities will persist in the future, underlining Infineon's growth potential and financial stability. Based on these findings, we project Infineon to be able to capitalize on growth opportunities and exhibit close-to-market or over-market revenue growth in the future. Hence, we expect that the strong growth in revenues will partially offset the relatively lower operating efficiency. Additionally, we project a continued ability to successfully mitigate industry risks such as cyclicality, creating an investment opportunity for investors who are looking for growth in harmony with sustainability.

Financial Projections

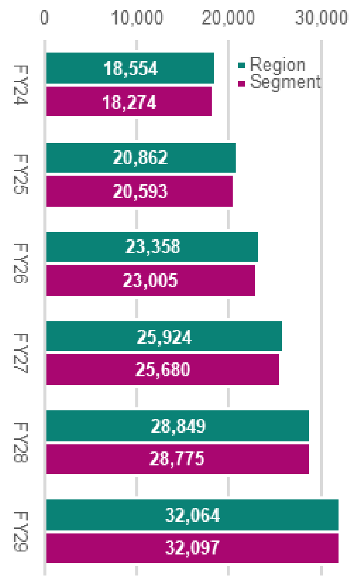
In accurately assessing the value of Infineon, we consider projections of future revenues to be a main driver. As can be seen from past performance, increases in profitability have mostly stemmed from increased growth in revenues and less from improved operating efficiency. Therefore, a variety of projected market developments, as well as projected demand within key areas of applications for Infineon's products, have been considered as value drivers for anticipated revenue growth.To achieve a robust and holistic projection of revenues, we employ two methods: First, we project revenue growth per region and by segment individually. Both forecasts are then considered for computing final revenue projections (Figure 14). Whilst regional growth is focused on projecting the semiconductor market size as a driver for revenue growth, segment

Figure 14: Overview of Yearly Revenue Fcst

	Total Fcst by		Weight
	Regions	x	60%
+	Segments	x	40%
=	Total Revenue Fcst		
x	Relative Weight of Segment in Segment Fcst		
=	**Individual Segment Fcst**		

Source: ~~Refinitiv Workspace~~Own Estimates

Figure 15: Total Region vs Segment Fcst



Source: Own Estimates

projections are based on unique catalysts identified in each segment.[21] By considering both methods for our final revenue forecast, we acknowledge both the lack of sufficient available information on region-specific value drivers as well as insufficient past data for the chosen value drivers in the segment projections.[22]

Regional Forecast

We anticipate modest growth in China, targeting an achieved 1.20% market share gain by 2029

Infineon's historical data segregation of revenues from the **Chinese market** from the broader Asian market began relatively recently, resulting in insufficient data for a meaningful regression analysis. Consequently, we apply projected market share growth to forecasted semiconductor revenues for the region. Despite a 5.7% decline in China's semiconductor revenues in 2022 and a 7.3% decline in 2023, Infineon achieved revenue growth of 24.1% and 1.4% during these years, respectively. While it indicates Infineon's strong performance in the Chinese market, our market share growth forecast remains conservative. China's substantial investment in its domestic semiconductor industry in an effort to reduce imports under the "Made in China 2025" policy, presents a challenging environment for market share gains.[23] However, the significant growth in China's ATV semiconductor sector, Infineon's largest segment by revenue, partially mitigates these influences. Hence, we project a modest deceleration in market share gains, anticipating Infineon to reach 4.14% market share by 2029, up from 2.94% in 2023. This translates to an annual market share gain of 20bp. This trajectory is factored into a projected $CAGR_{23\text{-}29}$ of 13.1% for Infineon's revenue in this region.

We project an achieved total market share gain of 1.50% in Japan by 2029

Given a greater pool of available data on past market developments for the **Japanese semiconductor market**, we regress historical GDP and semiconductor market revenues since 1999. The results indicate a moderate correlation between GDP and the Japanese semiconductor market, confirming GDP as a significant value driver (p-value = 0.038), suggesting statistical significance. While the results imply only a moderate correlation, they provide a basis for consideration next to other factors. Japan's focus on technological collaboration and the absence of restrictive import policies offer a more favorable environment for Infineon's projected market share growth. Coupled with historical growth patterns we expect a relatively faster increase in market share in Japan than in China. By FY29, we expect market share to have grown from 4.16% in FY23 to 5.66%, considering an annual share growth of 25bp. This translates into a $CAGR_{23\text{-}29}$ of 12.2% for Infineon's revenue.

[21] Considering current contributions to sales, we attribute individual drivers to the respective segment forecast
22 Infineon does not provide specific segment separation for regions
[23] The "Made in China" policy is a strategic initiative by China to boost its domestic high-tech industries, aiming for technological self-sufficiency and reducing reliance on foreign technology, particularly in sectors like semiconductors and telecommunications

Market share growth in Asia Pacific ~~(excl. Japan, China)~~ is expected to annually increase by 15bps to 15.2%

The forecast for the **Asian Pacific region (excl. Japan, China)** follows the same principles as introduced for Japan. Whilst Infineon is currently expanding its production capabilities in Kulim (Malaysia), it is more focused on expansion in the Japanese and Chinese markets, partially offsetting potential effects from the Kulim expansion on market share growth. Additionally, fluctuations in market share appeared to be independent of the overall semiconductor revenue growth in the region. Therefore, we project Infineon's market share to increase relatively slower by 15pbs annually. This assumption results in a $CAGR_{23\text{-}29}$ of 15.2% for revenues in this region, representing overall market expectations.

EMEA forecast projects a revenue $CAGR_{23\text{-}29}$ of 8.8%

Infineon's revenue in the Americas is anticipates to grow above market growth

Similarly, projections for **EMEA** are mainly based on GDP growth within its regions. Our regression analysis of historical semiconductor revenues against GDP growth in the EMEA region shows a strong correlation (0.79). As sufficient data is provided for this region, we used a regression to forecast Infineon's revenues based on market projections, predicting a $CAGR_{23\text{-}29}$ of 8.8%. This aligns with our expectations given past performance and investment measures such as the expansion of manufacturing capacity in Dresden (Germany), which is expected to continue fueling growth for Infineon in the medium-term future.[24]

Infineon's revenue in the Americas is anticipates to grow above

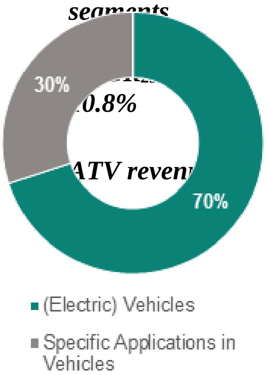
Infineon's revenue in Americas is anticipated to grow above market

This **Americas** is forecasted analogously to EMEA. Underlying GDPs are North, South, and Central America. Applying the same principles as before, we expect Infineon's revenues to grow at a $CAGR_{23\text{-}29}$ of 10.7%, outgrowing the market which is projected to grow at a $CAGR_{23\text{-}29}$ of 5.5%.

Automotive (ATV)

Figure 16: ATV Revenues – Weighting of Underlying Drivers

ATV revenue forecast based on segments



Source: ~~Refinitiv Workspace~~Own Estimates, Infineon

The global ATV semiconductor market is forecasted to grow at a $CAGR_{23\text{-}29}$ of 9.6%. With a 16.7% market share, Infineon holds a strategic position as the market leader in this high-growth segment. Based on the company's product portfolio, we have derived applicational areas to forecast revenues from this segment, resulting in a projected market share of 21.6% by FY29. Building upon our weights (Figure 16), projections suggest revenues to grow at a $CAGR_{23\text{-}29}$ of 15%, considering specific market dynamics and Infineon's market position.

- Vehicles

To forecast growth in demand for ATV semiconductors, we analyze global **EV revenue**, unit growth for **autonomous vehicles**, and **motor vehicle** production. These elements are weighted at 45%, 20% and 35% respectively.

Global EV revenues grew by 66% annually from 2020 to 2022, indicating robust growth in the market for electric vehicles. This trend is expected to continue with

[24] Infineon: Annual Report 2023

a 9.96% $CAGR_{23-29}$. As semiconductor density is higher for EVs than for fossil-fueled cars, their demand significantly impacts demand for ATV semiconductors, justifying a 35% weight for this driver. **Motor vehicle** production growth is expected to be fairly stable over the next six years, averaging 3.15% annual growth during this period. This stability is a crucial component of our total vehicle growth forecast due to its longstanding role as a fundamental driver of revenue in the segment. The consistent growth in motor vehicle production reflects sustained demand for Infineon's semiconductor products. Given that this traditional segment represents a baseline for ATV industry growth, its predictability provides a reliable foundation for projections. To reflect these factors, we have assigned a weight of 35%. **Autonomous vehicles** are in the early stage of adaptation and therefore have high growth expected in the near future with a $CAGR_{23-29}$ of 27.87%. For autonomous vehicles, advanced sensor and data processing products are crucial, driving demand and consequently impacting Infineon's revenues. We assign a weight of 20% to acknowledge their lower absolute contribution to the ATV market.

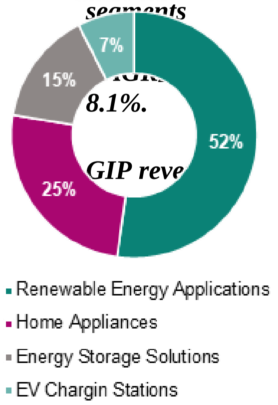
- Specific applications in vehicles

ATV revenue forecast based on segments suggests a $CAGR_{23-29}$ of 15%

To achieve a nuanced overview of demand for Infineon's products and revenues, revenue forecasts for global **vehicle infotainment**, **ADAS** (advanced driver assistance systems), **light vehicles with ADAS**, and **ATV cybersecurity** are considered as additional value drivers. While considering their relevance regarding Infineon's ATV portfolio, they do not account for a large share of revenues generated within this segment, reflected by the assigned 30% weight on our overall ATV forecast. The **vehicle infotainment** market, for which Infineon develops semiconductor solutions, is expected to increase from currently $48,570mn to $88,059mn by 2029 ($CAGR_{23-29}$: 9.96%). **ADAS** market size growth shows a projected increase from $34,150mn in 2023 to $65,152mn by 2029, projecting a growing demand for Infineon's sensors and processor solutions. The number of **light vehicles with ADAS** supplements our analysis by providing insights into the expected increase of ADAS complexity and the semiconductor content within these vehicles. Given the relatively modest forecasted growth ($CAGR_{23-29}$: 2.23%), the disproportionate increase in ADAS market size ($CAGR_{23-29}$: 11.37%) implies a significant increase in semiconductor density per vehicle. **ATV cybersecurity** market size is critical for demand growth as it incorporates the digitization of vehicles and is also directly targeted by Infineon's product solutions. Forecasted to grow at 10.93% in the next two years, continued by an average annual growth of 2.91% from 2026 to 2029, this application displays robust short-term growth potential but indicates a gradual deceleration in market expansion. This trend most likely derives from the maturing technology becoming a more integrated part of automotive systems.

Green Industrial Power (GIP)

Figure 17: GIP Revenues - Weighting of Underlying Drivers



Source: ~~Refinitiv Workspace~~Own Estimates, Infineon

To project revenue growth in Infineon's GIP segment, we consider different renewable energy applications as the main drivers (Figure 17). We predict a segment revenue CAGR of 8.14% through FY29, reaching €3,527 million. Despite slower growth than Infineon's core ATV segment, we expect Infineon to effectively capitalize on increasing demand.[25,26]

- Renewable energy

To provide a robust forecast within the renewable energy segment, we are considering multiple subsegments. Based on semiconductor usage within the subsegments, we assign the following weights: Globally **installed PVs** at 40%, **wind power installations** at 20%, **renewable energy market** at 20%, and **newly installed renewable energy capacity** at 20%. The market for **Installed PVs,** which heavily rely on semiconductors for energy conversion and management, is expected to grow at a $CAGR_{23-29}$ of 15.7%.[27] **Wind power installations** utilize semiconductors in power conversion and control systems, however, the semiconductor content per MW in wind power is lower compared to PV, implying a relatively smaller weight on our demand forecast. This application is projected to grow at a $CAGR_{23-29}$ of 7.1%.[27] Data on the **renewable energy market** includes areas with varying semiconductor intensity. It is included to additionally reflect a financial overview of growth in the renewable energy sector in indicating the market's potential and opportunities for semiconductor applications and is projected to grow with a 9.6% $CAGR_{23-29}$.[28] In line with this is the consideration of **newly installed renewable energy capacity** as a general measure of the RE capacity, including all forms of renewable energy, correlating with the increased demand for semiconductors in these technologies. Hence, both elements are assigned a 20% weight in the overall renewable energy value driver.

- Home appliances

Although less contributing to the company's revenues, this subsegment is also covered by Infineon's product portfolio. According to the availability of data, we divide it into **smart thermostats** and **air-conditioning** revenues. Owing to the significant difference in market size ($3,900mn vs. $60,120mn) we apply weights

[25] Infineon Investor Call PSS 2022
[26] The weight allocation is based on the weight of respective contributions to Infineon's revenues in this segment
[27] Statista (2023)
[28] Infineon Investor Call PSS 2022

of respectively 20% and 80%. As **Smart thermostats** are a specific area of application for Infineon's products, it is considered in our revenue forecast. Additionally, global **air-conditioning** market growth is included, as it represents another significant product focus of Infineon's home appliance semiconductor products. Together, a weighted CAGR$_{23\text{-}29}$ of 11.4% revenue growth is expected.[27]

- EV charging stations

While partially being captured in the revenue forecast for the ATV segment, EV charging station infrastructure is also a crucial component of GIP. Recently, it has seen significant growth and is projected to maintain a high growth rate with a slight decrease over the next six years. We look at both **charging station revenues** and **charging station units**, weighing them equally. This enables a monetary and hardware-focused sector view, resulting in a 21.1% CAGR$_{23\text{-}29}$.

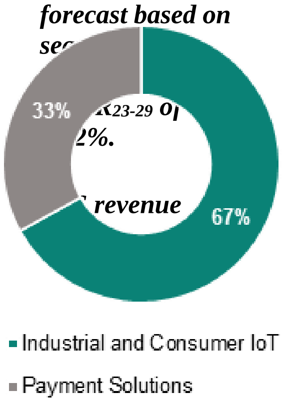
- Energy storage solutions

GIP revenue forecast based on segments suggests a CAGR$_{23\text{-}29}$ of 8.1%.

To assess the growth in demand for energy storage solutions we consider solution types such as **battery** (40%), **hydrogen** (20%), **thermal** (20%), and **pumped hydro** (20%) storage. Weights are attributed based on both market size and relevance within the context of semiconductors. Based on these calculations, we arrive at a CAGR$_{23\text{-}29}$ of 15.9% for energy storage solutions.

Connected Secure Systems (CSS)

Figure 18: CSS Revenues – Weighting of Underlying Drivers



Source: ~~Refinitiv Workspace~~Own Estimates, Infineon

Forecasts for revenues in the CSS segment rely on industrial and consumer IoT and demand for payment solutions in line with Infineon's portfolio in this segment. CSS revenues are projected to grow in accordance with the demand for applications in this segment, which is in line with past revenue developments, leading to €3,663mn projected revenues by FY29.

- Industrial and Consumer IoT

We forecast demand for industrial and consumer IoT by considering the demand for **smart home** appliances, **infotainment/ADAS** (other weightings than in ATV), **wearables,** and **IoT-connected devices**. The assigned weights are 15%, 15%, 20%, and 60% respectively. The **smart home** element consists of forecasted average growth of households with SH systems, SH security revenues, SH control and connectivity, global SH revenues, and sales of major household appliances. Taking these into account, we estimate a CAGR$_{23\text{-}29}$ of 10.8%. In the context of the CSS segment, **infotainment** includes ATV infotainment and connected cars market size, which aligns with Infineon's application portfolio in the segment. This results in 15.4% CAGR$_{23\text{-}29}$. **Wearables**, specifically global activity tracker devices, and global smartwatch device shipments contribute through demand for products like microcontrollers, embedded security controllers, and connectivity solutions. Based on our forecast for these devices, we estimate a $CAGR_{23\text{-}29}$ of 5.31% for wearables. **IoT-connected devices are** the most important driver for the industrial and consumer IoT division, also reflected in the relatively high assigned weight. This driver incorporates all subsequent markets and is therefore essential to achieve a broader demand assessment for our projections for industrial and consumer IoT.

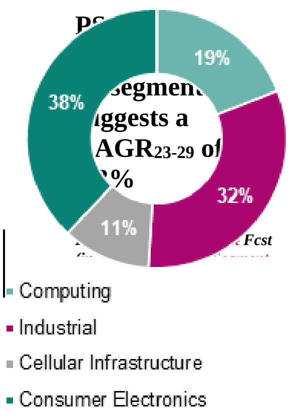
- Payment Solutions

CSS revenue forecast based on segments suggests a $CAGR_{23\text{-}29}$ of 10.2%.

Cashless transaction growth is anticipated to decline from annual growth of 16.1% in 2023 to 8.3% in 2029.[29] However, it is still heavily fuelling demand for processing solutions and thereby demand for Infineon's products. **Credit, debit and prepaid cards in circulation** are a key factor in this forecast as they fundamentally drive the demand for payment systems, forming the basis for the expanding need for semiconductors within payment solutions. Currently amounting to 26,686mn cards, it is projected to grow to 29,586mn by 2029. This fairly moderate growth balances the strong growth of cashless transactions into a more comparable context accounting for the non-linear relationship between semiconductor demand based on growth in transactions.

Power & Sensor Systems (PSS)

Figure 19: PSS Revenues – Weighting of Underlying Drivers



Source: ~~Refinitiv Workspace~~Own Estimates, Infineon

This segment's revenue drivers cover the applications for Infineon's product portfolio, namely computing, industrial, cellular infrastructure, and consumer electronics. Historical slower growth in Infineon's PSS segment revenues relative to PSS market growth indicates that the company has not been able to capitalize linearly on market growth. To reflect this, we applied a discount of 300bp on anticipated market growth to project Infineon's PSS revenues.

- Computing

IT spending on data centers is included as data centers are significant consumers of power and sensor systems. The spending trends in data centers provide insights into the level of investment in infrastructure that requires advanced power management and sensor solutions, directly impacting semiconductor demand in this sector. Since data centers are critical consumers of power and sensor systems and have a direct correlation with semiconductor demand, we apply a significant weight of 35%. **Spending on cloud & data centers** is important due to the growing reliance on cloud computing, which

[29] Statista (2023)

necessitates robust and efficient power and sensor systems. As cloud infrastructure expands, the demand for high-performance semiconductors in power management and sensor technologies also increases, making this a key driver for revenues from computing. The expanding cloud infrastructure is closely tied to data center growth. Although overlapping with IT spending on data centers, it also captures broader cloud-related investments, justifying a substantial weight of 30%. **IoT-connected devices are** relevant as each device necessitates semiconductors for connectivity and power management. The rise in the number of IoT devices directly increases demand for Infineon's sensor and power systems. Even though it is a major driver, it has a slightly less direct impact compared to data center spending as IoT devices often have diverse and sometimes lower semiconductor needs on an individual basis than the other drivers. Accordingly, a weight of 20% is attributed. **IoT global revenue** adds a monetary perspective to the last driver. While providing a comprehensive view of the market size and growth potential in IoT, it is not as directly correlated to semiconductor demand, as it does not directly translate to semiconductor revenue, hence the smaller weight.

- Industrial

Revenues from charging stations are directly linked to the growth in EV charging infrastructure, providing insights into the market demand for EV on-board chargers and infrastructure, both of which require Infineon's PSS products. Due to the direct impact on the demand for EV on-board chargers and charging infrastructure, we assign a weight of 30%. **Charging stations** reflect the scale of deployment and expansion of EV charging infrastructure, being a direct market for PSS components and sensor systems. While being a key indicator of the growth of the EV infrastructure, this metric mainly offers a more quantitative measure of market expansion, justifying the weight of 25%. **IoT global revenue (excl. consumer)** is included as it encompasses the financial scale of IoT in industrial applications, directly tied to the market potential for semiconductors. Covering a broad range of industrial applications, reflecting extensive market opportunities for semiconductors in various industrial applications, we assign a weight of 45%.

- Cellular Infrastructure

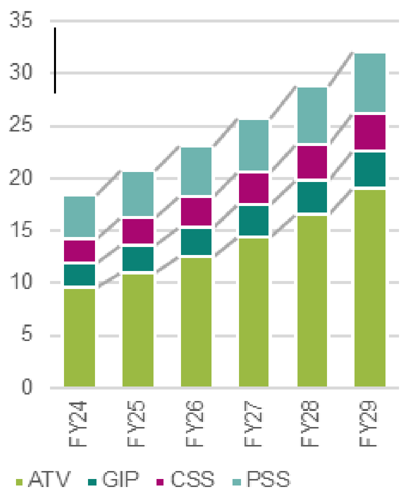
Global cellular subscriptions are a direct indicator of the scale and demand for cellular network infrastructure, including base stations, telecommunication servers, and backhaul systems. As the number of subscriptions grows, the need for robust and efficient infrastructure to support this user base increases, which in turn drives demand for Infineon's power and sensor systems in these areas. To

Preparation of 6G start will further fuel demand for cellular infrastructure

capture ongoing demand for cellular infrastructure we apply a weight of 40%, recognizing incremental advancements of this technology and its stable demand and maturity. **Global 5G subscriptions** directly impact the deployment of 5G infrastructure, including massive MIMO (Multiple Input Multiple Output technology). Massive MIMO is a key feature of 5G networks that requires power management and sensor systems. Given the increased complexity of the 5G market, we attribute a weight of 60%, highlighting the higher revenue and market expansion opportunities for Infineon's PSS segment.[30]

- Consumer Electronics

Figure 20: Final ~~Segment~~ Fcst (in €bn) – Region & Segment Fcst combined



Based on the following drivers for consumer electronics, we estimate this segment to grow at a $CAGR_{23\text{-}29}$ of 6.9%. **Smartphone revenues & unit sales** both are relevant due to smartphones being a major application for power management and sensor systems, including USB Type-C and USB Type-C PD, which are direct use cases of Infineon's PSS solutions. We assign a higher weight to smartphone revenues because revenues indicate a shift towards higher-value, technology-advanced phones. These typically require more complex semiconductors, aligning with Infineon's PSS product portfolio. Accordingly, revenues offer a better indication of market potential and profitability than the sales volume. Hence, we apply weights of 30% and 20% respectively. Growth in demand for **wearables** is relevant because wearables increasingly require semiconductors in power management and sensing capabilities. Despite their growing popularity, wearables currently present a smaller market compared to sectors like smartphones, justifying a more moderate weight of 15%. This metric's underlying drivers are the same as those introduced under CSS. The **E-bike market size** indicates the demand for semiconductors within its market, particularly for power management systems and sensors. While the market is expanding, it is smaller in scale compared to sectors like smartphones, hence a weight of 10% is attributed. **Global household major appliances revenues**, such as refrigerators, washing machines, and air conditioners, are increasingly integrating smart and energy-efficient technologies. These appliances often require more complex, non-commodity semiconductor components for power management and sensor functionalities. Given their higher complexity and the growing trend towards smart and connected homes, this sector has a significant impact on the demand for Infineon's PSS products. Therefore, a weight of 10% reflects its importance in the overall demand mix. **Global small household appliance revenues**, including items like microwaves, coffee makers, and toasters, are also adopting smarter technologies but typically involve less

[30] Hakeem et al.: Vision and research directions of 6G technologies and applications

complex semiconductor needs compared to major appliances. While the market for small appliances is substantial, the per-unit semiconductor content and value are generally lower than in major appliances. Consequently, this segment is assigned a lower weight of 5%. **SH growth** gives an indication of the demand for sensor and power management systems in smart home devices, including appliances in lighting and security systems, impacting the market for Infineon's PSS products. While the market for this application is significant, it is smaller and not as established as the smartphone market, justifying a smaller weight of 10%.

Operating Forecast

PSS revenue forecast based on segments suggests a CAGR$_{23\text{-}29}$ of 7.3%

Over the past five years, Infineon has been able to reduce its cost of revenues by 7.5% from 62% to 54.4%. We have found that increases in cost of revenues have been closely linked to increases in raw material prices and idle costs in the past. This relationship can particularly be observed in FY20, when cost of revenues increased by 5.4% due to the 11% increase in average raw material prices such as silicon, gallium, and palladium.[31] In FY20, the increase in raw material prices continued (11% increase in average semiconductor raw material prices) and decreased demand for semiconductors continued to increase idle costs, overall increasing cost of revenues by 5.4% to 68.1% in FY20. Due to the unforeseeable nature of such macroeconomic events, we assume their absence in our projections. Hence, we considered current raw material price projections for our cost of revenue forecast. After the decrease in raw material prices in FY23, prices are expected to increase in FY24 to return to an annual growth rate of 3.6% by FY25, which is projected to decrease to 3% annual growth by 2029. As we expect an improvement in manufacturing efficiency and inventory management during the projected period, we forecast increased raw material prices to be offset by these improvements, overall projecting stable cost of revenues. However, we expect a slight increase relative to FY23 due to the disproportional increase in raw material price increase in FY24. With stable input costs, we assume cost of revenues to be at 55% for the forecast period.

In the past, **R&D expenses** have increased mainly because of sudden increases in employees i.e., through the Cypress acquisition in FY20 that caused R&D expenses to increase to 14% of revenues. Once the acquisition had its full effect on revenues, R&D expenses decreased as a proportion of revenues to 12.2% in FY23. As we are not projecting any major acquisitions in our model, we assume R&D expenses to stay consistent at 12.2% of revenues for the projected period.

[31] IMF Primary Commodity Price System (2023)

Infineon's upcoming facility expansions will temporarily increase SG&As

Similarly, Infineon has experienced increases in **SG&A expenses** since FY18 mainly due to the increase in SG&A employees through the Cypress acquisition and has been able to decrease SG&A expenses to 9.8% of revenues by FY23. To project SG&A expenses, we have considered the expansion of Infineon's manufacturing facilities, especially in Dresden, which will increase the number of employees during the period of FY24-FY26 before the facility generates revenues. Hence, we project SG&A expenses to reflect this increase in employees, assuming the number of employees to increase each year from FY24-FY26, increasing SG&A expenses from 12% in FY24 to 14% in FY25 and 16% in FY26. Once revenues can be generated from the expansion, we project SG&A expenses to decrease to 13% in FY27, and 11% in FY28, reflecting the increasing value generated.

Valuation

Our valuation methodology integrates a relative valuation using multiples with a Discounted Cash Flow (DCF) analysis, incorporating multiple scenarios to enhance the robustness of our price target, accounting for both an intrinsic view and an extrinsic view. This combined approach is designed to mitigate potential projection inaccuracies and to account for market volatility.

Relative Valuation

- Comparable Company Analysis (CCA)

CCA leads to a share price projection of €46.85

From an initial pool of 38 companies, we've identified 11 peers (initial group of 10 companies from analysis of financial statements, expanded by Intel) to be most similar to Infineon based on their geographic presence, business models, and key financial metrics. These 11 companies are split into two groups according to their ranking of similarity, providing a focused peer comparison for accurate market assessment. EV/Sales is considered as the semiconductor industry is a capital-intensive industry and many companies heavily invest in R&D. Hence, a sales multiple provides insights into Infineon's market value concerning its core business operations and ability to generate revenue growth. To achieve a nuanced view of Infineon's relative market value we further include EV/EBIT in the valuation, which accounts for the effects of D&A expense, being relevant in an innovation and technology-driven industry. The P/E ratio reflects investors' expectations of the market and helps us assess how the market values a company's current earnings with its share price. While we find the resulting EV/Sales multiples to be equal at 4.0x for both groups and EV/EBIT only slightly differing (12.8x for group 1, 12.9x for group 2), more significant differences are found in P/E multiples. Whilst the P/E multiple is 14.2x for group 1, group 2 resulted in a P/E ratio of 15.5x. To reduce the impacts of idiosyncratic factors, we are considering multiples from group 2 for the valuation. Throughout the analysis, forward multiples for 2024 are used. We compute the final share price of the CCA valuation by equally weighting resulting share prices from the three considered multiples, resulting in a share price projection of €46.85.[32] When comparing CCA valuation results to the results yielded from the intrinsic valuation (see chapter on DCF), positive market sentiment among investors and potentially strong expectations for future revenue and EBIT growth of Infineon are implied.

- Comparable Transaction Analysis (CTA)

Figure 21: Precedent Comparable Transactions' Ranking

Tier 1	1	Xilinx
	2	Dialog Semiconductor
	3	Cypress Semiconductor
	4	Maxim Integrated Products
Tier 2	5	Toshiba
	6	Osram Licht
	7	Kyocera AVX
Tier 3	8	National Instruments
	9	Veoneer
	10	Kemet
Tier 4	11	Atotech Deutschland
	12	CMC Materials
	13	NxEdge

Source: Own Estimates~~Refinitiv Workspace~~, PitchBook

Tier 1 & 2 EV/Sales & EV/EBIT multiples lead to implied share prices of €47.45 & €78.86

In our valuation analysis for Infineon, we consider a range of semiconductor industry transactions from the last three years, categorizing them into Core Semiconductor Competitors (Tier 1), and Related Semiconductor and Component Manufacturers (Tier 2). Based on the available data on precedent transactions, we assess for best comparability regarding business model, operating markets, market capitalization, and EBITDA margin, averaging at 27% for Tier 1, compared to a last three-year average of 32.26% for Infineon. The inclusion of a broader set of companies mitigates the lack of directly comparable recent transactions, offering a wider but still pertinent dataset for a multiple analysis. To get a more comprehensive view of calculated multiples based on Tier 1 and Tier 2 combined, we additionally consider the multiples of peripheral and indirect market participants, and industry suppliers and service providers. The central cohort for our direct valuation analysis is composed of Tier 1 & 2. Due to the limited number of transactions among the primary comparable companies, we include this secondary set to achieve a sufficiently diverse dataset for median calculations. These firms share enough common ground with Infineon to warrant a meaningful comparison. This combined analysis (Tier 1 & 2) yields an average implied EV/EBIT multiple of 26.0x and EV/Sales multiple of 3.4x, substantially higher than those of Infineon, which is largely attributable to the control premiums embedded within transaction prices.

WACC

To have a representative D/E ratio incorporated into the model, we consider the past and future D/E ratios based on estimated market values. As they stay in a respectable range for the future (0.10-0.11), we leave the calculated weights (FY23) unadjusted. This leads to a weighted average cost of debt of 1.80%. Considering the market value of equity, our weighted average cost of equity

[32] Reflecting its significance of providing a market-based view, we attribute a 15% contribution to our final target share price. CCA: P/E, EV/Sales, EV/EBIT

Figure 22: Selected WACC Components

Cost of Equity	
Beta	1.47
Risk free rate (rf)	2.36%
Market Risk Premium	5.70%
Cost of Equity	**10.76%**
Capital Structure	
Market Value of Equity	47,300
Market Value of Debt	5,235
Total Capital	**52,536**

Source: Own Estimates~~Refinitiv Workspace~~, Infineon, Bloomberg

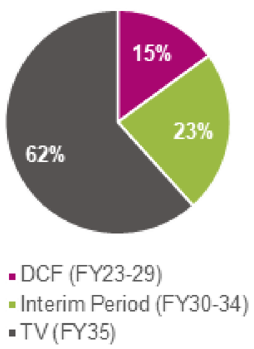
results in 9.68%. Adding both weighted average cost rates leads to a WACC of 9.81%. Since the underlying capital structure mostly consists of equity, the WACC is highly sensitive to changes in cost of equity. To enhance the accuracy of our analysis and capture a comprehensive risk profile, we calculate the industry beta using a regression. Regressing Infineon's historical stock returns on the EUROSTOXX 600 index, we find a beta of 1.47. This index is selected over narrower indices such as the DAX to ensure a diversified and representative dataset, given Infineon's base in the European market. For the regression, we employed weekly data from the past five years to calculate excess returns against 10-year German Government Bond yields, thus establishing a risk-free rate. We used weekly data to balance between data sufficiency and mitigating the noise often associated with higher-frequency data. Incorporating this beta into the CAPM together with a risk-free rate of 2.36% (10-year German government bond) leads to a calculated total cost of equity of 10.76%.

As for the cost of debt, market value of debt is calculated using Infineon's average debt maturity, the total projected book value of debt in FY24, assuming that average maturity is consistent with FY23, incorporated forecasted interest expenses for FY24 and the current cost of debt derived by the pre-tax cost of debt (2.5%) and the marginal tax rate of 28% (corporate tax rate of 15% plus solidarity surcharge of 5.5% of the corporate tax rate and trade tax rate of 12%).

Interim Period

Given Infineon's current trajectory of higher growth, and the anticipation of continued expansion in the near future, it is unlikely that the company will reach a steady growth state by the end of FY29. To achieve a more precise valuation, we include an interim period of five years from FY30 to FY34, following our financial forecast horizon. This approach allows us to integrate projected growth until FY34 while accounting for the increasing uncertainty in projections. During this interim period, we align the growth in unlevered free cash flows (UFCF) with the anticipated growth rates of the semiconductor industry. These growth rates are projected to gradually decrease from 5.3% in 2030 to 3.5% in 2034, reflecting a shift towards alignment with long-term GDP growth trends. The cash flows generated in this interim period are discounted to the valuation date (31st December 2024), serving as an additional component in the computation of Infineon's enterprise value.

Figure 23: Enterprise Value Distribution

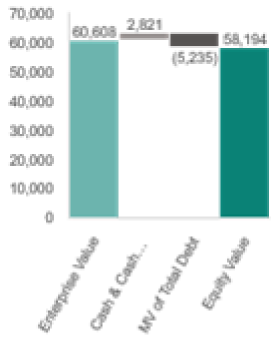


Source: Own Estimates~~Refinitiv Workspace~~

Terminal Value (TV)

Our TV follows the forecasted interim period and provides Infineon's projected value from FY35 forward, discounted to the valuation date. We use the expected global real GDP growth from 2020-2035, averaging 2.8% per year for the perpetual growth of the company. This approach is underlined by the forecasted inflation of the raw materials required for Infineon's production. Raw materials price inflation is expected to significantly decrease in the future, such that their inflation is fairly in line with the average global GDP growth.[33] Our assumed terminal growth of 2.8% is in line with Infineon's expected stable growth in a post-forecast period characterized by less volatility and uncertainty. By using a perpetual growth rate that is conservative in comparison to the high growth rates of the earlier years, we account for the expected deceleration of growth as Infineon and underlying market drivers mature. This approach is substantiated by Infineon's role in the semiconductor industry, which, while cyclical, has a solid base in continuous technological development and innovation driving sustained demand far into the future. Our valuation of Infineon from FY35 onwards intentionally avoids using exit multiples from trading and transaction comparables. As we are calculating our TV based on UFCFs from FY35 onwards, these short-term indicators are not suitable for projecting the company's long-term value due to the significant time gap, which introduces a high level of uncertainty and potential market changes. Additionally, the volatile nature of the semiconductor industry implies that current multiples may not accurately reflect the company's potential and intrinsic value.

Figure 24: EV Equity Bridge (in €mn)



Source: Own Estimates~~Refinitiv Workspace~~

Discounted Cash Flow (DCF)

Figure 25: DCF Components

Perpetuity Method	
Final Year Cash Flow (2034)	6,035
Perpetuity Growth Rate	2.8%
WACC	9.8%
Terminal Value	88,823
Discount Factor	9.25
Discounted Terminal Value	37,356
(+) Discounted UFCFs (2025-2029)	9,058
(+) Discounted UFCFs (2030-2034)	14,194
Enterprise Value	**60,608**
Per Share Analysis	
Enterprise Value	60,608
(-) Gross Debt	5,235
(+) Cash and Equivalents	2,821
Equity Value	**58,194**
(/) FDSO	1,306
Implied Equity Value per Share	**€ 44.56**

Source: Own Estimates~~Refinitiv Workspace~~

To determine Infineon's equity value as of December 31st, 2024, we employ the calculated WACC of 9.81% to discount projected UFCFs. We use mid-year discount factors to represent the timing of these yearly projected cash flows more accurately. Implementing all components yields a total EV of €60,608mn. To transition from EV to equity value, we deduct the projected market value of debt for FY24, amounting to €5,235mn, and incorporate the projected cash and cash equivalents of €2,821mn. This calculation leads to an equity value of €58,194mn, translating to an implied equity value per share of €44.56 (see Figure 25).

Note that this share value does not represent our base case scenario, but serves as a key input to calculate our base case by applying a Monte Carlo (MC) simulation.

▪ Sensitivity Analysis

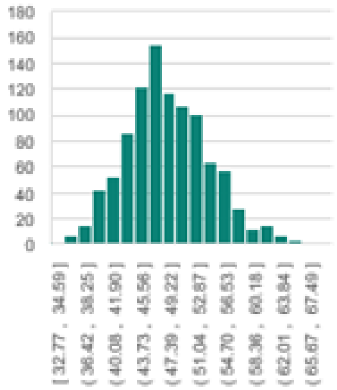
Based on the most determining factors driving our valuation, we analyze the sensitivities of revenues, perpetuity growth, and WACC. Due to the nearly identical revenue forecasts based on regions and operating segments, the final

[33] Statista (2023)

valuation is sensitivity towards changes in weights is neglectable. Nevertheless, sensitizing total revenue growth on a yearly basis shows the high dependence of revenue growth on our final valuation (Appendix, Figure 1). Our DCF is more sensitive to perpetuity growth rate than changes in WACC, explained by the longer forecasting period, reducing the impact of perpetuity growth because of a longer discount period (Appendix, Figure 2). Interim period growth changes have much less influence on the final valuation.

- Scenario Analysis

Figure 26: Distribution of Simulated Share Prices



Source: Own Estimates~~Refinitiv Workspace~~

The **base case** is built upon the foundation of the DCF value. The base case share price is derived from an MC simulation, providing a more nuanced view than the singular value from our DCF model. We model metrics used to forecast our statement items, by determining standard deviations (SD) for randomizing our inputs. Hereby we based our SDs on past financial developments; in many cases, we allowed for numbers that exceed past amplitudes. The key inputs WACC and perpetuity growth are considered with a SD of 0.5% respectively. To reflect natural variability, we assume a normal distribution for randomizing our values within the assigned SDs. We do not simulate values that we have treated as non-core in our financial projections. The MC iterated 1000 individual share prices, outputting our base case price of €48.19, the mean of all observations. Our MC approach enables a more accurate picture of the valuation, as inputs will realistically change partially independent of each other.

Figure 27: Snapshot of used metrics for MC basis

% of Cash & Cash Equivalents
% of Revenues
% of Operating Expenses
% of long- and short-term debt
% of Gross Debt
DSO
DPO
Income Tax Rate in %
Dividend Payout Ratio

Source: Own Estimates~~Refinitiv Workspace~~

Our **bear case** considers poor implications on Infineon's development, regarding revenue growth, cost efficiency, and all other underlying drivers for forecasting the company's financials. In this scenario, WACC is set to 11.8% (+2% from base case), perpetuity growth to 2.3% (-0.5% from base case), and yearly revenue growth is adjusted by -10%. Additionally, all financial item forecasts have been adjusted to a more pessimistic setting. These assumptions lead to a share price of €36.19. This price indicates what could theoretically happen when pessimistic assumptions are applied to all inputs.

The **bull case** utilizes the same approach as the bear case, except for using the most optimistic assumptions regarding revenue growth, cost efficiencies, and more, leading to the share price of €71.56.

Valuation Risks

The semiconductor industry's cyclical nature presents risks for Infineon, with fluctuations often occurring due to inventory changes in client industries. Infineon's significant investments in new technologies can also lead to supply inflexibility, impacting its response to demand shifts.[34] Reduced activity in fabs can lower capacity utilization and dilute operating profits for Infineon, particularly during downturns. Infineon's revenues reflect the cyclical nature of global trade, with a notable correlation with economic conditions historically.[34] Infineon's significant dependence on the fluctuating automotive industry and the uncertainty of government policies related to electric vehicles notably impact its sales.[35] Infineon faces risks from potential order cancellations due to customers' duplicate orders and its reliance on external manufacturers for supplies and price negotiations, impacting revenue and margins.[36] Additionally, the competitive landscape may intensify, putting pressure on the company's market share and pricing power globally, especially with Chinese vendors rapidly expanding their manufacturing capacities in mature nodes.[37]

Infineon's revenues are closely tied to global economic conditions & automotive cycles

Infineon is challenged by the emerging SiC market, which, despite its current niche status and cost issues, is expected to grow significantly due to its technical superiority over traditional solutions (CAGR of 26% between 2022 to 2030).[38,39] While this risk is being addressed by constructing the 200-millimeter SiC power fav in Kulim, it remains uncertain how it will precisely impact Infineon's future market share in this segment.[36]

Exchange rate fluctuations pose a financial risk to global operations

Another uncertainty that cannot be fully incorporated into future projections is foreign exchange rate risks. Infineon has a varying but significant portion of its revenue, COGS, R&D expenses, and SG&As denominated in foreign currencies, mainly in US$.

Recommendation

Considering our target price of €48.73 for Infineon Technologies AG, an anticipated dividend of €0.48 in 2024, and the current share price of €38.04 (as of 19.12.23), we project a substantial upside potential of 29%.[40] The company's strong margins, robust cash flows, minimal debt, and sufficient cash reserves position it well to navigate economic challenges. Expected tailwinds from market drivers, coupled with its expansion strategy, suggest that the company is well-prepared to effectively capitalize on these opportunities. Therefore, our stock recommendation is to **Buy.**

[34] Deutsche Bank Research: Extraordinary semiconductor cycle triggered by one-time events, cyclical and geopolitical effects
[35] Handelsblatt: Im neuen Jahr droht Vollbremsung bei Elektromobilität.
[36] Infineon: Investor Presentation Q3 FY23
[37] Electronicsweekly: China increasing capacity at mature nodes
[38] McKinsey: New silicon carbide prospects emerge as market adapts to EV expansion
[39] Medium: Semi insulator SiC Substrates Market Size: Share and Scope Projections
[40] Final target price calculation: 0.8 * Base Case DCF + 0.15 * CCA + 0.05 * CTA

Appendix

Figure 1: Sensitivity to Changes in Perpetuity Growth and WACC

Perpetuity Growth Rate \ WACC	10.8%	10.3%	9.8%	9.3%	8.8%
2.0%	€ 36.64	€ 38.82	€ 41.33	€ 44.23	€ 47.62
2.5%	€ 37.99	€ 40.40	€ 43.20	€ 46.46	€ 50.30
2.8%	€ 38.97	€ 41.55	**€ 44.56**	€ 48.10	€ 52.29
3.5%	€ 41.25	€ 44.27	€ 47.82	€ 52.05	€ 57.16
4.0%	€ 43.24	€ 46.66	€ 50.73	€ 55.64	€ 61.66

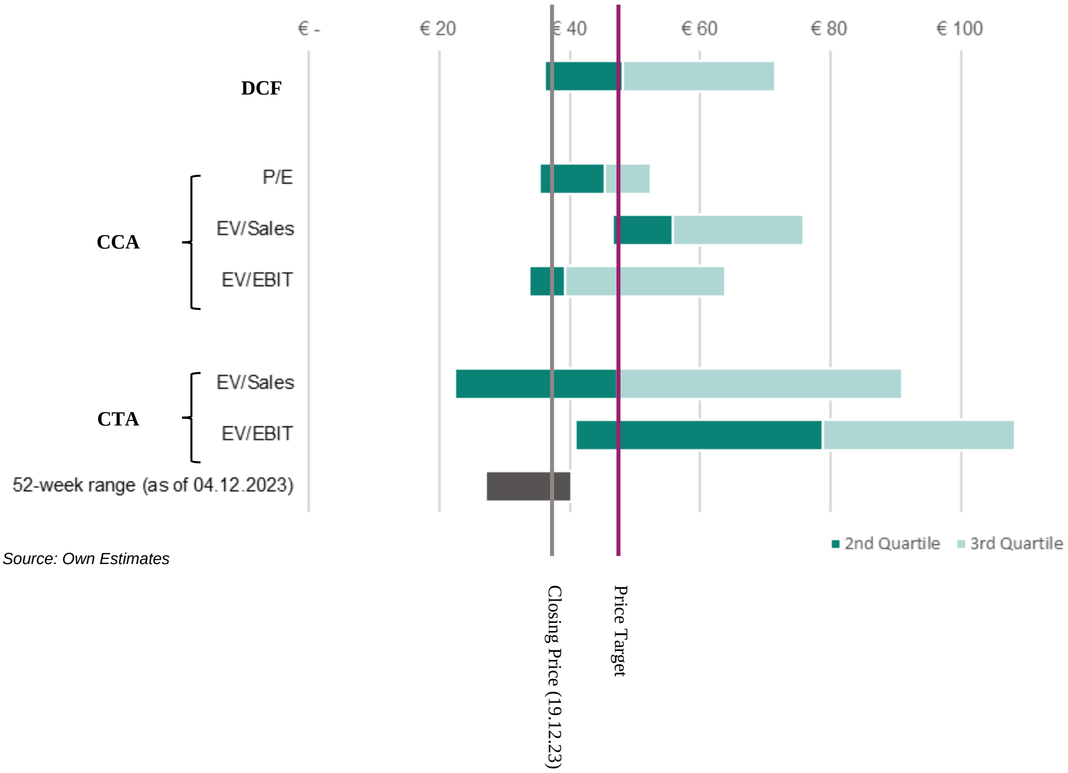
Source: Own Estimates~~Refinitiv Workspace~~

Figure 2: Sensitivity to Changes in Yearly Revenue Growth

-7.5%	-5.0%	-2.5%	0.0%	2.5%	5.0%	7.5%
€ 37.04	€ 39.40	€ 41.91	**€ 44.56**	€ 47.43	€ 50.49	€ 53.71

Source: Own Estimates

Figure 3: Valuation Football Field



Source: Own Estimates

Financial Statements

Income Statement € in millions, unless otherwise noted	A2019	A2020	A2021	A2022	A2023	F2024	F2025	F2026	F2027	F2028	F2029
Revenue											
Automotive	3,503	3,542	4,841	6,516	8,242	9,560	11,001	12,578	14,409	16,619	19,053
Green Industrial Power	1,418	1,406	1,542	1,790	2,205	2,410	2,614	2,820	3,035	3,273	3,526
Connected Secure Systems	642	953	1,397	1,822	2,046	2,321	2,582	2,893	3,143	3,403	3,662
Power and Sensors System	2,445	2,650	3,268	4,070	3,798	4,095	4,503	4,855	5,191	5,510	5,843
Other Operating Segments	21	16	12	20	18	0	0	0	0	0	0
Total Revenues	**8,029**	**8,567**	**11,060**	**14,218**	**16,309**	**18,386**	**20,700**	**23,146**	**25,778**	**28,805**	**32,084**
Cost of Revenues	**5,035**	**5,836**	**6,814**	**8,094**	**8,896**	**10,112**	**11,385**	**12,731**	**14,178**	**15,843**	**17,646**
Gross Profit	**2,994**	**2,731**	**4,246**	**6,124**	**7,413**	**8,274**	**9,315**	**10,416**	**11,600**	**12,962**	**14,438**
Operating Expenses	**1,833**	**2,150**	**2,764**	**3,255**	**3,465**	**4,310**	**5,266**	**6,352**	**6,816**	**6,896**	**7,200**
SG&A Expenses	867	1,060	1,369	1,577	1,599	2,206	2,898	3,703	3,867	3,601	3,529
Research & Development Expense	1,054	1,203	1,556	1,899	1,985	2,238	2,519	2,817	3,137	3,506	3,905
Other Operating Expense/(Income)	(88)	(113)	(161)	(221)	(119)	(134)	(151)	(169)	(188)	(210)	(234)
Operating Profit	**1,161**	**581**	**1,482**	**2,869**	**3,948**	**3,964**	**4,049**	**4,064**	**4,784**	**6,066**	**7,238**
Non-Operating Expenses	**50**	**100**	**156**	**118**	**27**	**21**	**21**	**41**	**41**	**41**	**(105)**
Interest Expense	36	101	150	131	159	126	126	146	146	146	0
Equity Loss/(Earnings)	6	9	-9	(39)	(27)	0	0	0	0	0	0
Other Non-Operating Expenses/(Income)	(28)	(57)	(8)	(4)	0	0	0	0	0	0	0
Normalized Pre-tax Profit	**1,111**	**481**	**1,326**	**2,751**	**3,921**	**3,943**	**4,028**	**4,023**	**4,743**	**6,024**	**7,343**
Other Non-Operating Income	**(28)**	**(57)**	**(7)**	**(28)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Pre-Tax Income	**1,083**	**424**	**1,319**	**2,723**	**3,921**	**3,943**	**4,028**	**4,023**	**4,743**	**6,024**	**7,343**
Taxes	**194**	**52**	**144**	**537**	**782**	**629**	**643**	**642**	**757**	**962**	**1,172**
Income Taxes for the Year	135	94	152	393	626	629	643	642	757	962	1,172
Income Taxes - Deferred	59	(42)	(8)	144	156	0	0	0	0	0	0
Net Income	**889**	**372**	**1,175**	**2,186**	**3,139**	**3,313**	**3,385**	**3,381**	**3,985**	**5,063**	**6,170**
Extraordinary Activities Gain/(Loss)	(19)	(4)	(6)	(7)	(2)	0	0	0	0	0	0
Interest Expense - Hybrid	0	35	26	29	29	30	28	29	29	29	0
Income available to Common Shares	**870**	**333**	**1,143**	**2,150**	**3,108**	**3,284**	**3,356**	**3,351**	**3,956**	**5,034**	**6,170**

Balance Sheet												
€ in millions, unless otherwise noted	A2018	A2019	A2020	A2021	A2022	A2023	F2024	F2025	F2026	F2027	F2028	F2029
Assets												
Current Assets												
Cash & Cash Equivalents	732	1,021	1,851	1,749	1,438	1,820	2,821	2,895	3,972	5,487	8,771	12,668
Short-Term Investments	1,811	2,758	1,376	2,173	2,279	1,770	1,770	1,770	1,770	1,770	1,770	1,770
Trade Accounts & Trade Notes Rec.	971	1,057	1,196	1,483	1,887	1,991	2,186	2,461	2,752	3,065	3,425	3,815
Other Receivables	52	174	174	139	143	178	181	204	228	254	283	316
Inventories	1,480	1,701	2,052	2,181	3,081	3,974	4,419	4,868	5,330	5,814	6,366	6,951
Assets Held for Sale/Discontinued Ops.	11	12	0	9	0	0	0	0	0	0	0	0
Other Current Assets - Total	366	770	530	518	625	959	1,081	1,217	1,361	1,516	1,694	1,887
Total Current Assets	**5,423**	**7,493**	**7,179**	**8,252**	**9,453**	**10,692**	**12,458**	**13,416**	**15,412**	**17,905**	**22,309**	**27,407**
Non-Current Assets												
Investments in Associates, JV	37	29	87	71	100	114	90	92	126	174	279	402
Receivables & Loans - LT	0	0	1	1	2	2	0	0	0	0	0	0
Property, Plant & Equipment	3,038	3,510	4,396	4,779	5,950	7,450	9,918	12,609	14,864	16,226	16,535	17,294
Deferred Tax - Asset - LT	648	599	627	695	527	268	268	268	268	268	268	268
Other non-current assets	137	145	191	225	314	389	439	494	552	615	687	765
Goodwill	764	909	5,897	5,962	7,083	6,547	6,547	6,547	6,547	6,547	6,547	6,547
Intangible Assets excl. Goodwill	832	896	3,621	3,349	3,483	2,977	2,799	2,683	2,621	2,608	2,642	2,721
Total Non-Current Assets	**5,456**	**6,088**	**14,820**	**15,082**	**17,459**	**17,747**	**20,060**	**22,693**	**24,978**	**26,438**	**26,958**	**27,998**
Total Assets	**10,879**	**13,581**	**21,999**	**23,334**	**26,912**	**28,439**	**32,518**	**36,108**	**40,390**	**44,343**	**49,267**	**55,405**
Liabilities & Shareholder's Equity												
Current Liabilities												
Trade Accounts Payable & Accruals - ST	1,181	1,089	1,160	1,569	2,260	2,765	3,052	3,415	3,636	3,770	3,919	4,466
ST Debt & Current Portion of LT Debt	25	22	564	899	828	330	330	330	384	384	384	384
Income Taxes - Payable - Short-Term	117	144	340	288	356	418	418	418	418	418	418	418
Other Current Liabilities - Total	859	958	1,386	1,687	2,144	2,156	2,431	2,737	3,060	3,408	3,808	4,241
Total Current Liabilities	**2,182**	**2,213**	**3,450**	**4,443**	**5,588**	**5,669**	**6,231**	**6,900**	**7,498**	**7,980**	**8,529**	**9,509**
Non-Current Liabilities												
Debt - Long-Term - Total	1,507	1,534	6,763	6,017	5,220	4,712	4,712	4,712	5,481	5,481	5,481	5,482
Deferred Tax & Investment Tax Credits - Long-Term	9	20	293	324	371	254	254	254	254	254	254	254
Other Non-Current Liabilities - Total	735	1,181	1,274	1,149	789	760	1,630	1,836	2,052	2,286	2,554	2,845
Total Non-Current Liabilities	**2,251**	**2,735**	**8,330**	**7,490**	**6,380**	**5,726**	**6,596**	**6,802**	**7,787**	**8,021**	**8,289**	**8,581**
Total Liabilities	**4,433**	**4,948**	**11,780**	**11,933**	**11,968**	**11,395**	**12,827**	**13,702**	**15,285**	**16,001**	**16,818**	**18,090**
Shareholders' Equity												
Common Stock - Treasury/Repurchased	37	37	33	28	23	13	13	13	13	13	13	13
Common Equity - Contributed	6,760	7,995	9,074	9,125	9,191	9,296	9,296	9,296	9,296	9,296	9,296	9,296
Retained Earnings - Total	(333)	421	435	1,407	3,506	6,204	8,851	11,567	14,265	17,502	21,609	26,474
Comprehensive Income - Accumulated	56	254	(460)	(306)	1,067	354	354	354	354	354	354	354
Hybrid Financial Instrument - Equity	0	0	1,203	1,203	1,203	1,203	1,203	1,203	1,203	1,203	1,203	1,203
Total Shareholder's Equity	**6,446**	**8,633**	**10,219**	**11,401**	**14,944**	**17,044**	**19,691**	**22,407**	**25,105**	**28,342**	**32,449**	**37,314**
Total Liabilities & Shareholders' Equity	**10,879**	**13,581**	**21,999**	**23,334**	**26,912**	**28,439**	**32,518**	**36,108**	**40,390**	**44,343**	**49,267**	**55,405**

Cash Flow Statement											
€ in millions, unless otherwise noted	A2019	A2020	A2021	A2022	A2023	F2024	F2025	F2026	F2027	F2028	
Cash Flow from Operations											
Net Income	889	372	1,175	2,186	3,139	3,313	3,385	3,381	3,985	5,063	6,170
Depreciation & Amortization	945	1,260	1,513	1,664	1,674	1,885	2,332	2,831	2,958	3,028	2,918
Deferred Tax – Asset	49	-28	-68	168	259	0	0	0	0	0	0
Deferred Tax & Investment Tax Credits	11	273	31	47	-117	0	0	0	0	0	0
Extraordinary Adjustments to Net Income	-19	-4	-6	-7	-2	0	0	0	0	0	0
Changes in Working Capital	**-1,750**	**2,381**	**-182**	**-367**	**-776**	**-203**	**-215**	**-322**	**-495**	**-571**	**-220**
Short-Term Investments	(947)	1,382	(797)	(106)	509	0	0	0	0	0	0
Trade Accounts & Trade Notes Receivable	(86)	(139)	(287)	(404)	(104)	(195)	(275)	(291)	(313)	(360)	(390)
Other Receivables	(122)	0	35	(4)	(35)	(3)	(23)	(24)	(26)	(30)	(32)
Inventories	(221)	(351)	(129)	(900)	(893)	(445)	(450)	(461)	(484)	(552)	(585)
Assets Held for Sale/Discontinued Ops.	(1)	12	(9)	9	0	0	0	0	0	0	0
Other Current Assets	(404)	240	12	(107)	(334)	(122)	(136)	(144)	(155)	(178)	(193)
Trade Accounts Payable & Accruals ST	(92)	71	409	691	505	287	363	220	134	149	547
ST Debt & Current Portion of LT Debt	(3)	542	335	(71)	(498)	0	0	54	0	0	0
Income Taxes - Payable - Short-Term	27	196	(52)	68	62	0	0	0	0	0	0
Other Current Liabilities - Total	99	428	301	457	12	275	306	323	348	400	434
Net Cash Provided by Operating Activities	**125**	**4,254**	**2,463**	**3,691**	**4,177**	**4,996**	**5,502**	**5,889**	**6,448**	**7,519**	**8,868**
Cash Flow from Investing											
Investments in Associates, JV	(58)	16	(29)	(14)	24	(2)	(34)	(48)	(104)	(124)	
Investments excluding Loans	(8)	(46)	(34)	(89)	(75)	(50)	(55)	(58)	(63)	(72)	(78)
Capex (PPE)	(1,276)	(1,805)	(1,384)	(2,301)	(2,643)	(3,899)	(4,597)	(4,677)	(3,920)	(2,940)	(3,274)
Capex (Intangible Assets)	(205)	(3,066)	(240)	(668)	(25)	(276)	(311)	(347)	(387)	(432)	(481)
Acquisition & Disposal of Business	(145)	(4,988)	(65)	(1,121)	536	0	0	0	0	0	0
Other Investing Cash Flows	0	(1)	0	(1)	0	2	0	0	0	0	0
Total Cash Flow from Investing Activities	**(1,626)**	**(9,964)**	**(1,707)**	**(4,209)**	**(2,221)**	**(4,198)**	**(4,965)**	**(5,117)**	**(4,417)**	**(3,548)**	**(3,958)**
Cash Flow from Financing											
Dividends Paid	(305)	(336)	(286)	(351)	(417)	(628)	(630)	(643)	(710)	(917)	(1,266)
Change in Long-term Debt	27	5,229	(746)	(797)	(508)	0	0	769	0	0	1
Change in Common Equity	1,235	1,079	51	66	105	0	0	0	0	0	0
Common Stock - Treasury/Repurchased	0	4	5	5	10	0	0	0	0	0	0
Change in Hybrid Financial Instrument	0	1,203	0	0	0	0	0	0	0	0	0
Change in Paid in Capital	189	(18)	89	271	(22)	(39)	(39)	(39)	(39)	(39)	(39)
	644	(621)	29	1,013	(742)	870	205	217	233	268	291
Net Cash Provided by Financing Activities	**1,790**	**6,540**	**(858)**	**207**	**(1,574)**	**204**	**(463)**	**304**	**(516)**	**(687)**	**(1,013)**
Beginning Cash Balance	732	1,021	1,851	1,749	1,438	1,820	2,821	2,895	3,972	5,487	8,771
(+) Changes in Cash and Equivalents	289	830	-102	-311	382	1,001	74	1,077	1,515	3,284	3,898
Ending Cash Balance	**1,021**	**1,851**	**1,749**	**1,438**	**1,820**	**2,821**	**2,895**	**3,972**	**5,487**	**8,771**	**12,668**

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Report Recommendations

Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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