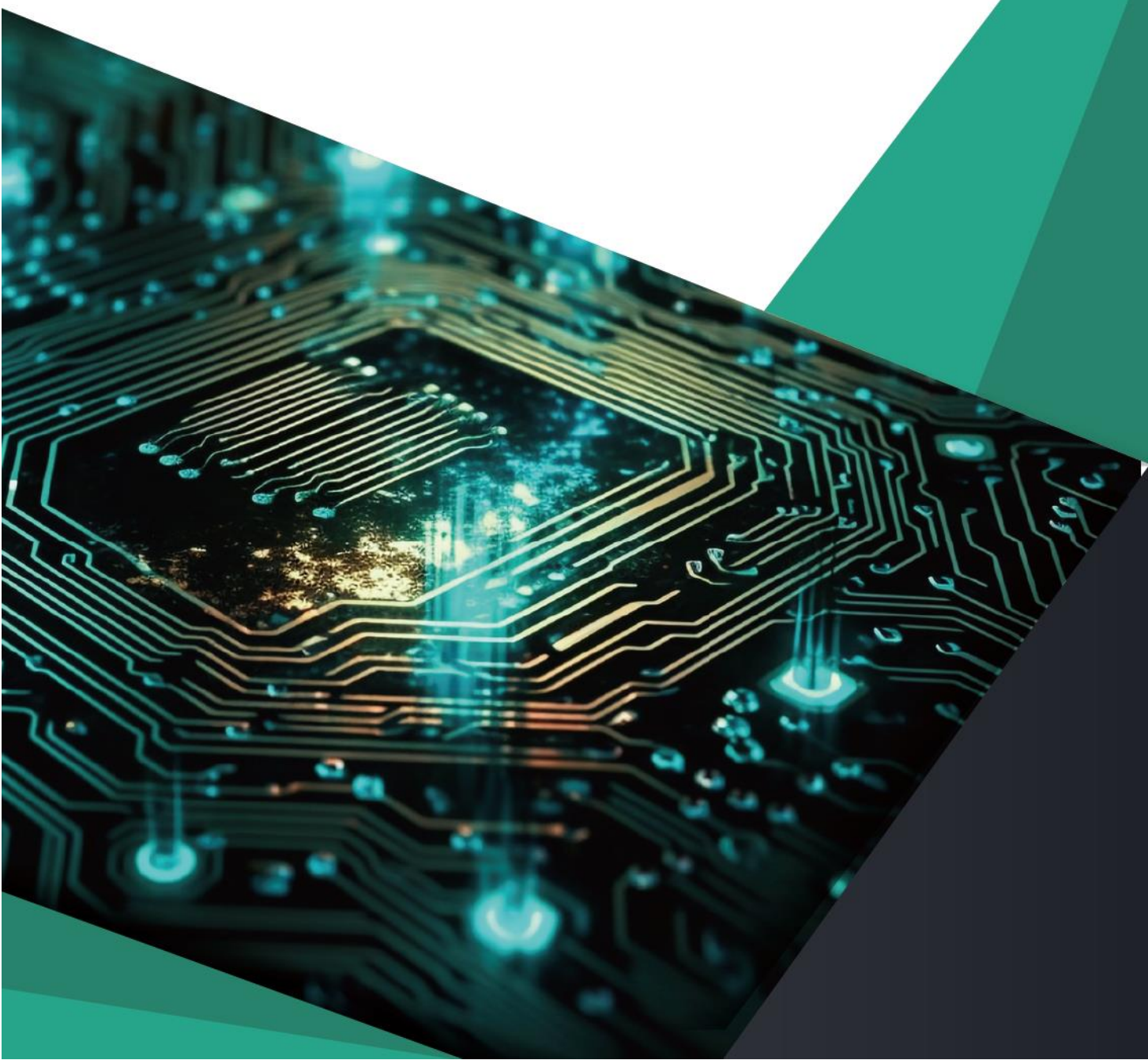
BRIOCEAN

Monthly #MarketMatters Report

November 2023



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Executive Summary

This report provides an overview of the semiconductor industry in November and attempts to identify potential market opportunities and risks over the next month. Based on the relevant data available, the report analyses macroeconomic factors, industry supply chains, as well as product market trends.

The semiconductor sector has continued to show signs of recovery despite the overall weak outlook for the global economy. Foreign investment is sought by some countries around the world in order to strengthen their semiconductor supply chains, and some developed countries plan to invest in facilities in order to reduce their reliance on China for semiconductor supply chains.

There has been an acceleration in artificial intelligence applications, resulting in a boom in the AI chips market in terms of market opportunities and risks. In addition, memory chipmakers are expected to reduce their production, resulting in an increase in sales and the average price of NAND Flash products. However, some consumer electronics are experiencing a lack of growth due to uncertain demand.

1. Macro Environment Overview

1.1 Global Economy Growth Remains Soft

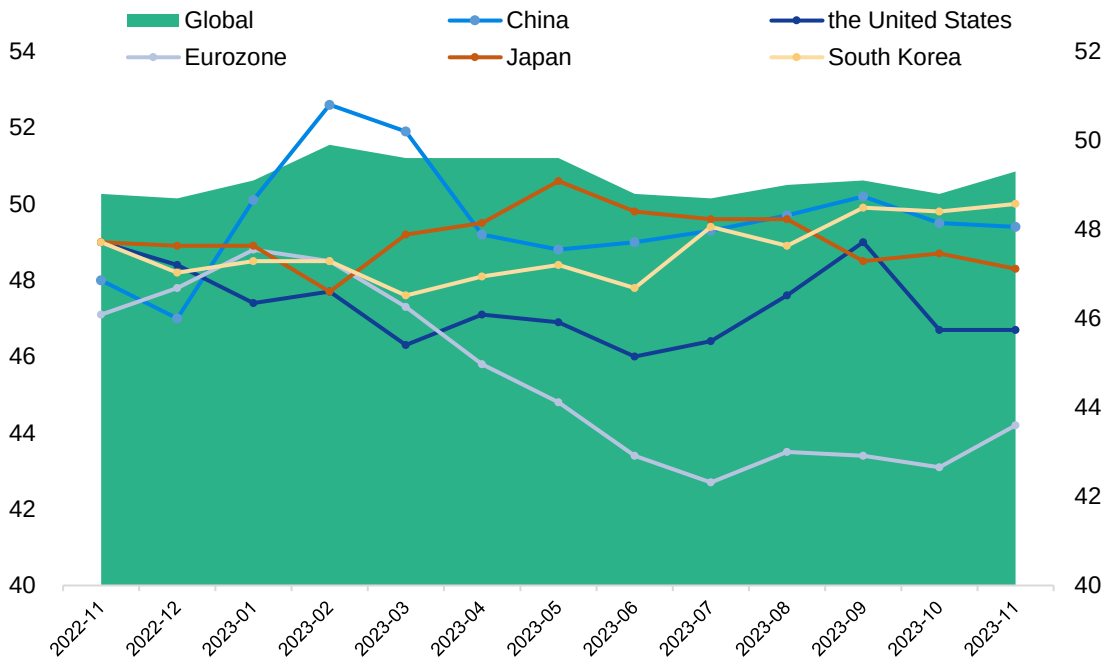
The global manufacturing PMI for November was 49.3, which recovered from the previous month but was still below the boom-bust line.

According to the PMI for manufacturing in Asia, China continued to experience a downward trend in November at 49.4; Japan's economic prosperity declined in November, whereas the manufacturing PMI index for South Korea increased to 50.

It is noteworthy that the U.S. manufacturing PMI for the month of November was the same as last month, standing at 46.7, indicating that downward pressure may continue to exert itself on the United States' economy. The manufacturing sector in Mexico, however, continues to prosper.

The manufacturing PMI for the Eurozone rose slightly to 44.2 in November from 43.1 the previous month. However, it continued to underperform.

Manufacturing PMIs

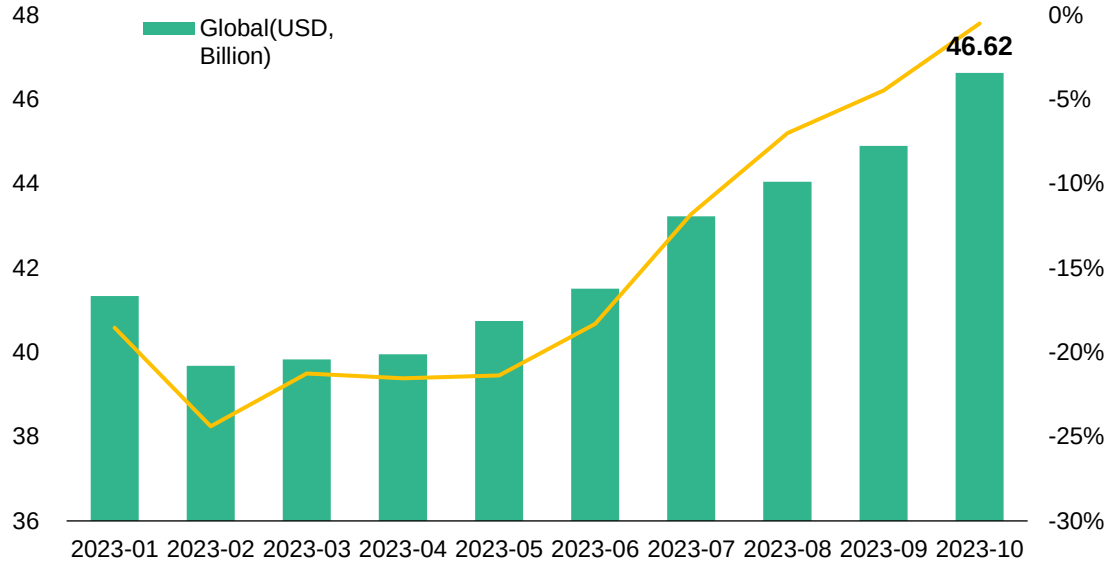


Data Source: Choice

1.2 Asia-Pacific's Semiconductor Market Outperforms the Global Market

The Semiconductor Industry Association (SIA) reported that global semiconductor sales for November were USD 46.62 billion, representing a 0.5% annual decline and a 3.9% monthly increase. According to the report, the semiconductor industry has experienced a recovery trajectory.

Global Semiconductor Market Size (USD, in Billion)



Data Source: SIA

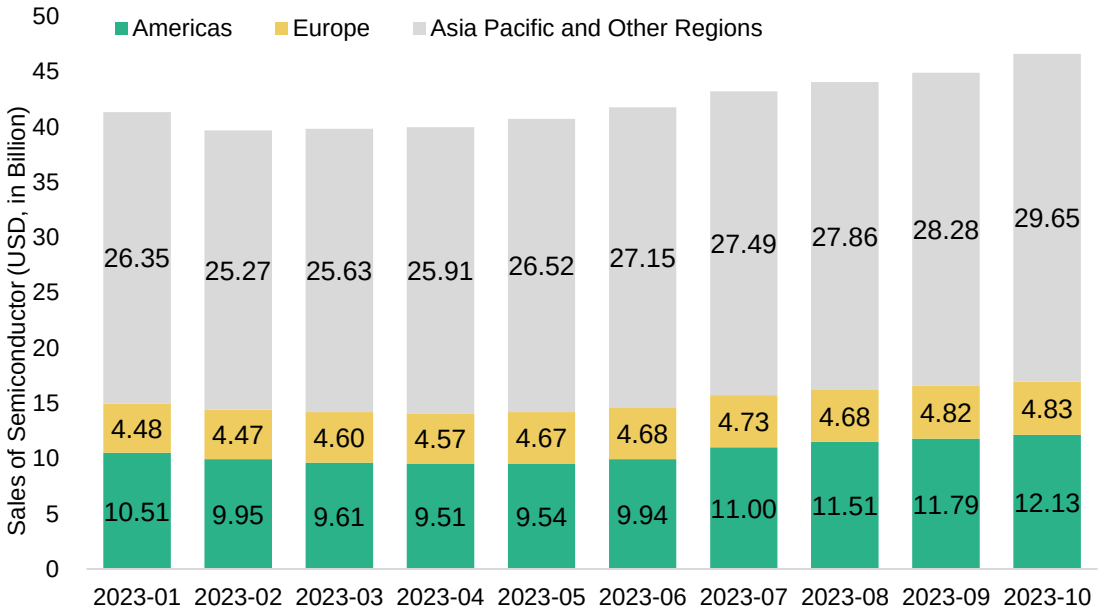
The sale of semiconductors in the Asia-Pacific region (including China and Japan) amounted to USD 29.65 billion in November, representing a decrease of 1.4% on an annual basis and an increase of 4.8% month-over-month. Assuming a global market share of 63.6%, Asia-Pacific's overall demand growth is impressive.

According to market segmentation, China's semiconductor sales reached USD 13.85 billion, which shows an apparent recovery as monthly growth of 6.1% was higher than the global and Asia-Pacific regions. In contrast, there are no tangible signs of recovery in the Japanese semiconductor market, which recorded USD 3.93 billion in sales in November, up 0.5% month-over-month.

The semiconductor market in the Americas was valued at USD 12.13 billion in November, with a growth rate of 2.9%. This indicates a positive outlook for the American market.

The semiconductor sector in Europe recorded sales of USD 4.83 billion despite continued market subdued conditions.

Semiconductor Market Size by Region (USD, in Billion)



Data Source: SIA

1.3 South Korea Witnesses the First Rise of Chip Exports in 16 Months

The exports of South Korea rose 7.8% year-on-year to USD 55.80 billion in November, accelerating from a rise of 5.1% the month before to mark the fastest rate of growth since July 2022. There has been an increase in semiconductor exports of 12.9% after declining for 15 months, suggesting an end to the slump in semiconductor demand. The South Korean government is hoping that a revival of chip demand will be able to boost growth given that the Bank of Korea may have to maintain its interest rates higher for a longer period, thereby restraining domestic demand. A tepid recovery of the global economy may also contribute to downside risks, as the momentum behind chip exports may not be strong enough.

1.4 Malaysia Aims to Attract Foreign Investments in Electric Vehicles and Chips

There is a considerable amount of activity in Malaysia to attract foreign investment in high-value industries such as electric vehicles, semiconductors, and carbon capture. With its reputation as a manufacturing hub, Malaysia is now attempting to move up the value chain of well-established industries, such as energy and electricals. Furthermore, Malaysia accounts for approximately 13% of global testing and packaging in the semiconductor industry. As a means of strengthening its semiconductor supply chain, the country intends to move to the front-end of the supply chain, which includes the design of integrated circuits as well as the fabrication of wafers.

1.5 Dutch Chipmakers Plans Manufacturing Investments in Vietnam

It has been reported that Dutch semiconductor companies and suppliers are planning to invest in Vietnam's manufacturing sector. While the investments are not substantial, they indicate a shift away from China as a source of exports in the midst of rising trade tensions. In response to the growing trade tensions between the West and Beijing, the Netherlands has curtailed its sale of most advanced chips to China. BE Semiconductor Industries, a Dutch manufacturer of chip equipment, announced that it had been approved to invest USD 5 million in the rental of a factory in Southern Vietnam. Additionally, Besi has plans to build a factory in Vietnam by the end of next year, increasing its investment in the country significantly.

2. Semiconductor Industry Updates

2.1 Silicon Wafer/Equipment

2.1.1 Resonac to Open Chip Packaging R&D Centre in the United States

A research and development centre for advanced semiconductor packaging and materials will be established in Silicon Valley by the Japanese chip materials manufacturer, Resonac. Currently, the United States is undertaking a USD 3 billion program to increase its packaging capabilities, and the packaging stage of production is becoming increasingly critical for the advancement of chip technology. This move by Resonac indicates that Japanese chip companies are seeking deeper levels of cooperation with the United States.

2.1.2 Synopsys and Microsoft Team Up for a Chip-design Assistant

Microsoft's Azure OpenAI platform has been used by Synopsys to create its own Copilot for the design of computer chips. This would help to identify and eliminate errors and bugs in the early stages of the process. In response to the growing demand for faster and more efficient chips that are AI-compatible, electronic design automation (EDA) firms such as Synopsys and Cadence Design System, which provide software and intellectual property for chip design, have gained greater market prominence. Demand has also been stimulated by the increase in custom chip design efforts by companies such as Microsoft and Alphabet.

2.2 IDM/Fabless

2.2.1 YMTC Sues Micron for Patent Infringement

On November 9, Yangtze Memory filed a suit against Micron and its subsidiaries for patent infringement. The suit alleges multiple 3D NAND technology patents of the company have been violated by these defendants. It also alleges that these infringements have been applied to its SSD products. The U.S. District Court for the Northern District of California has released documents describing these infringements. According to the allegations, three-dimensional NAND memory products with 96, 128, 176, and 232 layers are infringed. According to Yangtze Memory's indictment, Micron used Yangtze Memory's patented technology without authorisation to gain and maintain market share.

2.2.2 Nvidia Improves its Flagship Chip to Accommodate Larger AI Systems

Nvidia announced it will roll out its top-of-the-line chip for artificial intelligence within the next year, initially with Amazon.com, Alphabet's Google, and Oracle Inc. It is anticipated that the H200 chip will surpass Nvidia's current top-of-the-line H100 chip. This upgrade primarily consists of an increase in the amount of high-bandwidth memory, which is one of the most expensive components of the chip and determines its ability to process data, thus resulting in an increase in the cost of the memory itself.

2.2.3 Infineon's Revenue is Expected to be Boosted by a Recovery in Chip Demand

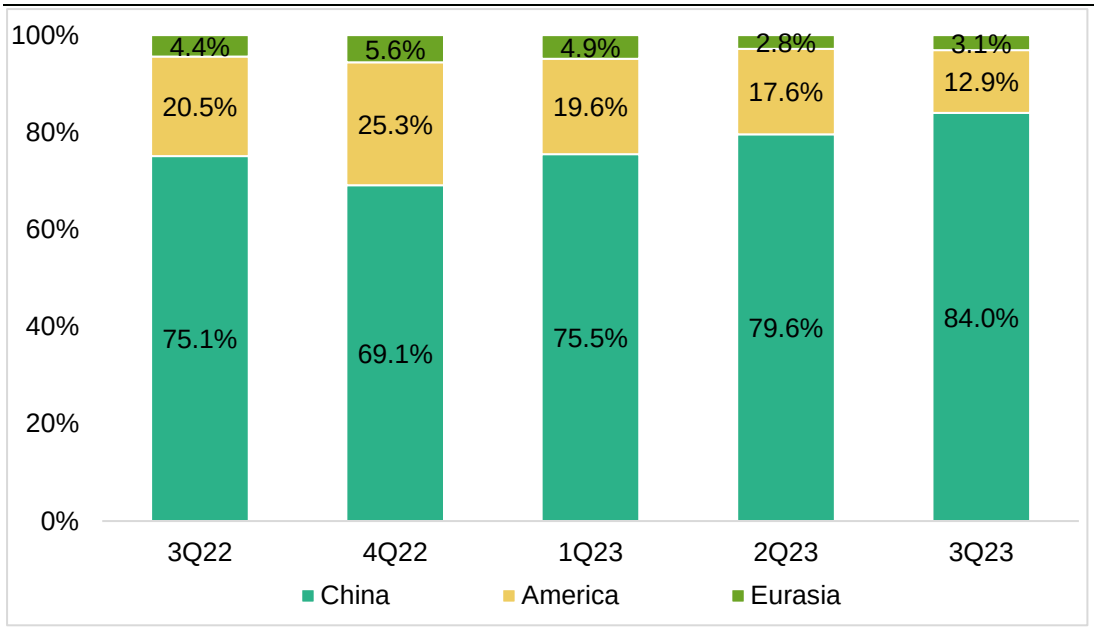
Infineon, a German chip manufacturer, reported higher-than-expected revenues for its fiscal year 2023 as semiconductor demand remains strong, particularly in the electromobility and renewable energy sectors. In contrast, consumer electronics, communication, computing, and Internet of Things applications have experienced a temporary decline in demand.

2.3 Foundry

2.3.1 China Chipmaker, SMIC, Hikes CapEx to USD 7.5 Billion for Production Expansion

The largest chip manufacturer in China, SMIC, has increased its capital expenditure budget for 2023 by 18% to USD 7.5 billion. This is citing the need to expand production and build new plants due to insufficient local production. The company has also continued to play a significant role in China's efforts to create a chip supply chain that is self-sufficient with the assistance of the government.

SMIC's Revenue Structure by Region



Data Source: SMIC

2.3.2 Chip Market Looks Bright with GlobalFoundries' Profit above Estimates

GlobalFoundries, a contract chipmaker, forecast higher profits for the fourth quarter than anticipated. This provides further evidence that semiconductor oversupply is subsiding. There are recent signs that the industry slump may have bottomed out, as customers, such as electronics manufacturers, have rebuilt inventories following the sudden drop in demand that followed the pandemic.

2.3.3 Rapidus Plans to Open U.S. Sales Office

Rapidus, a Japanese chip foundry, plans to open a sales office on the West Coast by the end of the year. Rapidus intends to manufacture cutting-edge chips in collaboration with IBM and Imec, a research organisation based in Belgium. Rapidus will be able to expand its business in the United States through the opening of the sales office, further increasing its competitiveness against other leading foundries, such as TSMC.

2.4 Packaging and Test

2.4.1 JCET's Acceleration of Packaging Construction with Industrial Capital

It has been announced that Changdian Technology has added to the capital of Changdian Technology Automotive Electronics (Shanghai) Co., Ltd. with industrial capital valued at RMB 4.8 billion for the construction of a packaging base for automotive chips.

2.4.2 Amkor Plans to Build a New Packaging and Test Facility in Arizona

A new advanced semiconductor packaging and test facility will be constructed in Arizona by Amkor Technology. This facility will be used for the packaging and testing of chips for Apple to be produced at the nearby facility of Taiwanese semiconductor manufacturer TSMC. The United States expects this facility to become the largest outsourced advanced packaging facility, which will allow it to reduce its reliance on other countries for microchip production.

2.5 Applications

2.5.1 Artificial Intelligence

In the wake of the United States banning Nvidia from selling high-end AI chips to China, Chinese Internet giants have placed orders for AI chips from domestic manufacturers such as Huawei, which will strongly encourage a domestic replacement of AI chips.

Company	Updates
Baidu	· Ordered artificial intelligence chips from Huawei this year, implying U.S. pressure drives Chinese acceptance of Huawei's products instead of Nvidia's
Microsoft	· Developed custom-designed computing chips to address artificial intelligence costs · A planned USD 3.2 billion investment in AI in Britain over the next three years
Tencent	· Stockpiled Nvidia chips but seeks Chinese alternatives

2.5.2 Automotive

The global demand for electric vehicles continues to increase, despite a moderate growth rate in electric vehicle demand in Europe due to the penetration of electric vehicles in emerging markets.

Company	Updates
General Motors	· Reorgainse BrightDrop's electric commercial vehicle unit to reduce independence
Continental	· Saved EUR 400 million by cutting thousands of jobs in its automotive division by 2025
Rivian	· Inked agreements with Georgia to begin construction on its planned electric vehicle factory · Truck and SUVs production forecasts increased by 2,000 to 54,000 units for the full year
Volkswagen	· Aims to have electric vehicles under USD 35,000 in the U.S. market in 3 to 4 years
BYD	· Hungary may be the site of its first European passenger car factory
Toyota	· Thailand will work with Toyota to develop the electric vehicle industry · Investing nearly USD 400 million in India's third manufacturing facility

2.5.3 Consumer Electronics

In the third quarter of 2023, DIGITIMES Research Center expects global laptop shipments to meet expectations, but in the fourth quarter, the volume is expected to decline 7.3% due to high inventories held by distributors. In view of the fact that the PC market is still not showing clear signs of recovery, there are still short-term risks involved.

Company	Updates
Lenovo	· Revenue fell 16% for the three months through September · Meeting market expectations as supply outpaced demand for personal computers
Apple	· Vision Pro will enter mass production with 60% Chinese-sourced components
HP	· Launching AI personal computers in the second half of next year and anticipating gradual growth
ASUS	· Changing demand in major markets, such as Asia and the Americas, is expected to decrease PC revenue by 15% quarterly

2.5.4 Industrial Automation

In the next five years, Mckinsey expects companies to spend approximately 25% of their capital budgets on automation. A significant portion of the capital expenditures in logistics and fulfilment will be accounted for by automation, making it the largest percentage of capital expenditures in any industry.

Company	Updates
ABB	· Sales and profit targets increased, ageing workforces addressed with automation, carbon emission reduced, and artificial intelligence emerging in factories
Yaskawa Electric	· USD 200 million to be invested in United States industrial robot production

2.5.5 Telecommunications

With the rapid deployment of satellite internet by domestic and international telecommunications companies, the potential market for satellite communication has grown considerably.

Company	Updates
1&1 Drillisch	· Launching its own network infrastructure based on Open RAN technologies in December
BT Networks	· Reducing costs and improving operational efficiency by eliminating obsolete equipment
Ericsson	· Interoperability testing of MediaTek's 6GHz licensed 5G frequency band completed successfully

2.5.6 Energy Storage

Overcapacity concerns have been raised due to the current inventory of energy storage products on the European market.

Company	Updates
GCL	· Released industry-leading 6MWh energy storage DC cabin
LG Energy Solution	· Koc Holding, a Turkish battery manufacturer, has reneged on an earlier agreement to form a joint venture with Ford and LG Energy Solution to produce commercial electric vehicle batteries

2.5.7 Medical Equipment

Medical chip procurement is expected to rise as leading manufacturers focus more on surgical robots.

Company	Updates
GE Healthcare	· Cooperated with Sectra, an international medical imaging IT giant, to provide more efficient medical imaging diagnosis solutions
Philips	· Developed an 8-year strategic partnership with NYU Langone Medical Centre worth USD 115 million to enhance patient care through innovation
Medtronic	· Expands the surgical robot sector in China to satisfy patients' needs

3. Market Trends of Products

3.1 Discrete

There is currently a slowdown in the growth of the demand for power devices, as well as structural changes within the industry. Considering the fact that electric vehicle manufacturers are increasingly using SiC devices, the demand for SiC devices is expected to continue to increase.

Product	Brand	Pricing	Lead Time (Weeks)
MOSFETs	Vishay	→	39-52/+
	Onsemi	→	26-50/+
	ST	→	16-32/+
Zener Diodes	Vishay	→	20-50/+
	Onsemi	→	8-20/+
	Micro Commercial Components	→	12-20/+
Rectifiers	Onsemi	→	12-20/+

3.2 Analog

There are still relatively high inventory turnover days among leading analog chip manufacturers. From a business standpoint, the telecommunications industry is in decline, while the automotive industry continues to grow. It is nevertheless evident that the demand for industrial automation remains weak, and according to TI, the number of orders for industrial automation is expected to decline further.

Manufacturers	Inventory turnover days		
	Q1	Q2	Q3
TI	181.93	197.50	202.93
ST	116.42	122.28	116.22
Onsemi	150.23	156.61	160.63

The prices of some analog devices from ADI and TI are on the decline, with delivery times ranging from 20 to 30 weeks.

Product	Brand	Pricing	Lead Time (Weeks)
Operational Amplifiers	ADI	↘	7-20/+
	TI	↘	6-26/+
ADCs	ADI	→	10-20/+
	TI	↘	6-20/+

3.3 Passives

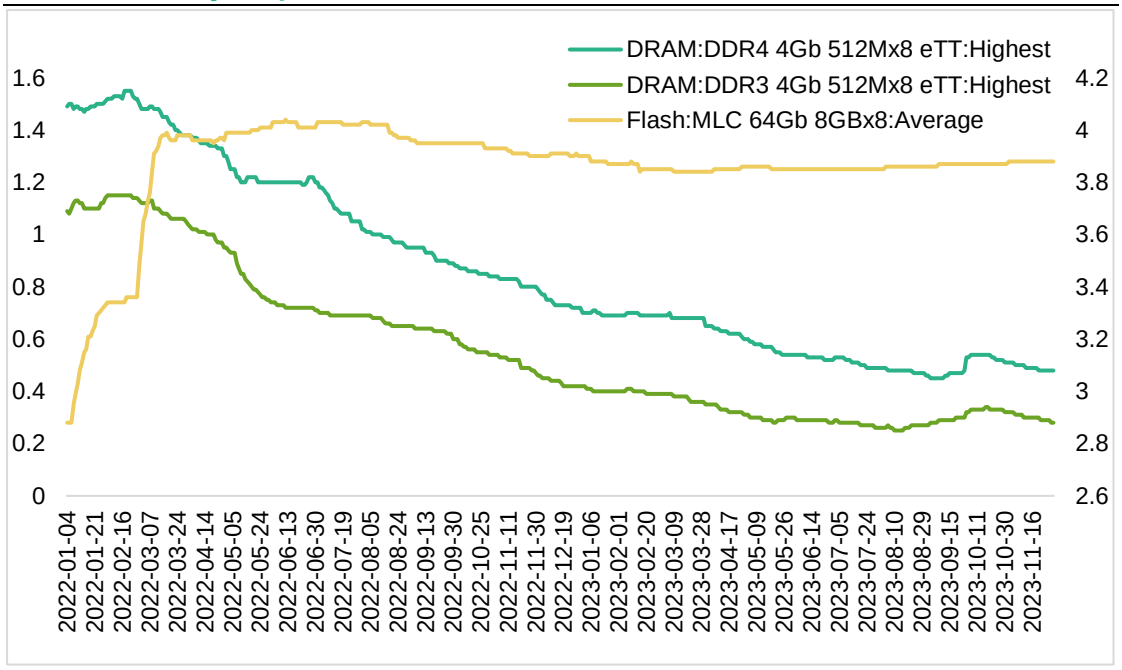
The outlook for the passive component market has improved as a result of the slight recovery in the consumer electronics market. Delivery times have also been extended in response to the improvement.

Product	Brand	Pricing	Lead Time (Weeks)
Chip Resistors	Panasonic	→	19-50/+
	Yageo	→	18-20/+
Aluminum Electrolytic Capacitors	Panasonic	→	22-30/+
Ceramic Capacitors	Murata	→	20-24/+

3.4 Memory

There has been a trend of differentiation in the spot market for memory chips in recent years. However, NAND Flash spot prices continued to remain high in November, despite a decline in DRAM spot prices.

Price of Memory Chips



Data Source: Choice

3.5 MCUs

There is a recent increase in demand for MCUs, and some devices are becoming more expensive and taking longer to deliver.

Product	Brand	Pricing	Lead Time (Weeks)
MCU, 8-bit	NXP	→	18-24/+
	Microchip	→	26-52/+
	Renesas	→	18-32/+
MCU, 16-bit	Microchip	→	18-52/+
	TI	→	6-20/+
MCU, 32-bit	NXP	→	13-26/+
	Microchip	→	35-52/+
	Renesas	↗	18-30/+
	TI	↗	6-20/+
Digital Signal Processors (DSP)	TI	↗	20-26/+

3.6 FPGA/CPLDS

Recently, the prices of FPGAs have stabilised, but delivery times have decreased.

Product	Brand	Pricing	Lead Time (Weeks)
Spartan 3, XC3Sxxx series	Xilinx/AMD	→	12-16/+
Spartan 6, XC6Sxxx series		→	12-16/+
Artix 7, XC7Axxx series		→	16/+
MAX 10, 10Mxxx series	Intel/Altera	→	20-24/+
Cyclone V, 5Cxxx series		→	20-24/+

4. Market Opportunities and Risks

4.1 Opportunities

4.1.1 Demand for AI Server Chips may Increase with Accelerating AI Application Progress

It is clear from a company's perspective that artificial intelligence continues to grow. Adobe and Snowflake, for instance, are developing artificial intelligence collaborative assistants to improve user interaction.

A number of countries around the world are actively developing AI supercomputing centres in the countryside. NVIDIA estimates that by 2024, all supercomputers based on Grace Hopper in the United States, Europe, and Japan will have a combined AI computing power of more than 200 exaFLOPS.

4.1.2 Outlook for NAND Flash Keeps Improving Benefited from Continued Production Cuts

As predicted by TrendForce, NAND Flash sales are expected to increase in the fourth quarter. There will be a quarter-on-quarter increase of more than 20% in the NAND Flash industry's revenue, with an increase of 13% in the average unit price. It is also expected

that revenue from some memory chip manufacturers will increase. For instance, Micron expects its revenue growth to exceed 20% in Q4, as well as a rebound in its quarterly contract prices.

4.2 Risks

4.2.1 A Lack of Growth Momentum in some Consumer Electronics

During this traditional peak season for consumer electronics, manufacturers have begun increasing stock levels. As a result of the economic downturn, the demand side remains under pressure, which is resulting in high inventories at distributors. Therefore, it may be difficult to sustain the growth momentum of mobile phone and PC chips.

Conclusion

In November, the global economy remained weak, and Asia-Pacific's semiconductor sector outperformed the entire market.

There has been a strong impact of foreign investments on semiconductor supply chains in some countries, and some developed countries intend to reduce their dependence on the Chinese market by investing in semiconductor manufacturing facilities.

The semiconductor industry may have reached a bottom as a result of the superior performance of major chipmakers. In addition, leading manufacturers are continually improving the functionality of their chips as the artificial intelligence sector continues to grow. In an effort to accelerate the growth of the semiconductor industry in Japan, the country's semiconductor manufacturers are seeking deep ties with the United States.

There has been a rapid growth in the market for artificial intelligence chips as a result of the progress of AI applications. The production cuts by memory chipmakers will also result in an increase in sales and the average price of NAND Flash products. Consumer electronics, however, lack growth momentum due to uncertain demand growth.

To conclude, the semiconductor industry continues to show signs of growth despite the dimming outlook for the global economy. The adoption of new policies by countries around the world will contribute to the development of semiconductor market landscapes. It is essential that companies in the industry remain vigilant and adapt to new strategies to remain competitive as market conditions change.

References

[1] Malaysia aims to attract foreign investments in EV, chip industries, reuters.com, 2023

[2] Dutch firms eye chips making in Vietnam amid China tensions, reuters.com, 2023

[3] S.Korea's chips exports rise for first time in more than a year, reuters.com, 2023

[4] Japan's Resonac to open chip packaging R&D centre in US, reuters.com, 2023

[5] Synopsys, Microsoft team up for a chip-design assistant, reuters.com, 2023

[6] Chinese chipmaker YMTC sues Micron alleging patent infringement, reuters.com, 2023

[7] Nvidia upgrades flagship chip to handle bigger AI systems, reuters.com, 2023

[8] Infineon reports better-than-expected 2023 revenue on semiconductor demand, reuters.com, 2023

[9] China chipmaker SMIC hikes capex to $7.5bn despite profit slump, asia.nikkei.com, 2023

[10] GlobalFoundries projects profit above estimates in positive sign for chip market, reuters.com, 2023

[11] Japan chipmaker Rapidus to open U.S. office by year-end, telecom.economictimes.indiatimes.com, 2023

[12] JCET to Build an Automotive Chip Advanced Packaging Flagship Factory in China, jcetglobal.com, 2023

[13] Amkor to build $2 billion Arizona semiconductor packaging plant, reuters.com, 2023

[14] Baidu placed AI chip order from Huawei in shift away from Nvidia, reuters.com, 2023

[15] Microsoft introduces its own chips for AI, with eye on cost, reuters.com, 2023

[16] Microsoft's $3.2 bln UK investment to drive AI growth, reuters.com, 2023

[17] Tencent says it stockpiled Nvidia chips but seeks Chinese replacements, cnn.com 2023

[18] GM reorganizes BrightDrop EV unit, business head leaving, reuters.com, 2023

[19] Continental Could Cut Thousands of Jobs in Cost-Saving Restructuring, wsj.com, 2023

[20] Rivian signs agreements with Georgia to start building EV factory, reuters.com, 2023

[21] Rivian raises production target amid broader EV demand fears, reuters.com, 2023

[22] Volkswagen aims to bring under-$35,000 EV to US in 3-4 years, reuters.com, 2023

[23] China EV maker BYD to build first Europe plant in Hungary, reuters.com, 2023

[24] Thailand, Toyota to jointly develop domestic EV industry, reuters.com, 2023

[25] Toyota to invest nearly $400 mln for third plant in India, reuters.com, 2023

[26] Lenovo posts another revenue decline as PC demand remains slow, reuters.com, 2023

[27] Vision Pro is about to be mass-produced, and the proportion of its components from mainland China has increased significantly to 60%, CLS.com, 2023

[28] HP CEO: First AI PCs Will Land In Second Half Of 2024, Adoption Will Take ‘Some Time’, crn.com, 2023
[29] Getting warehouse automation right, mckinsey.com, 2023
[30] Engineering group ABB points to long-term trends as it raises sales target, reuters.com, 2023
[31] Japan robot maker Yaskawa eyes $200 million US investment, hk.finance.yahoo.com, 2023
[32] 1&1 Drillisch will launch mobile services in December using its own network infrastructure, based on Open RAN technology, c114.com.cn, 2023
[33] Koc Holding revokes pact with Ford, LG Energy Solution for Turkey battery JV, reuters.com, 2023
[34] a2globalelectronics.com, 2023
[35] CXMT's LPDDR5 DRAM products validated by Xiaomi and Transsion, digitimes.com, 2023

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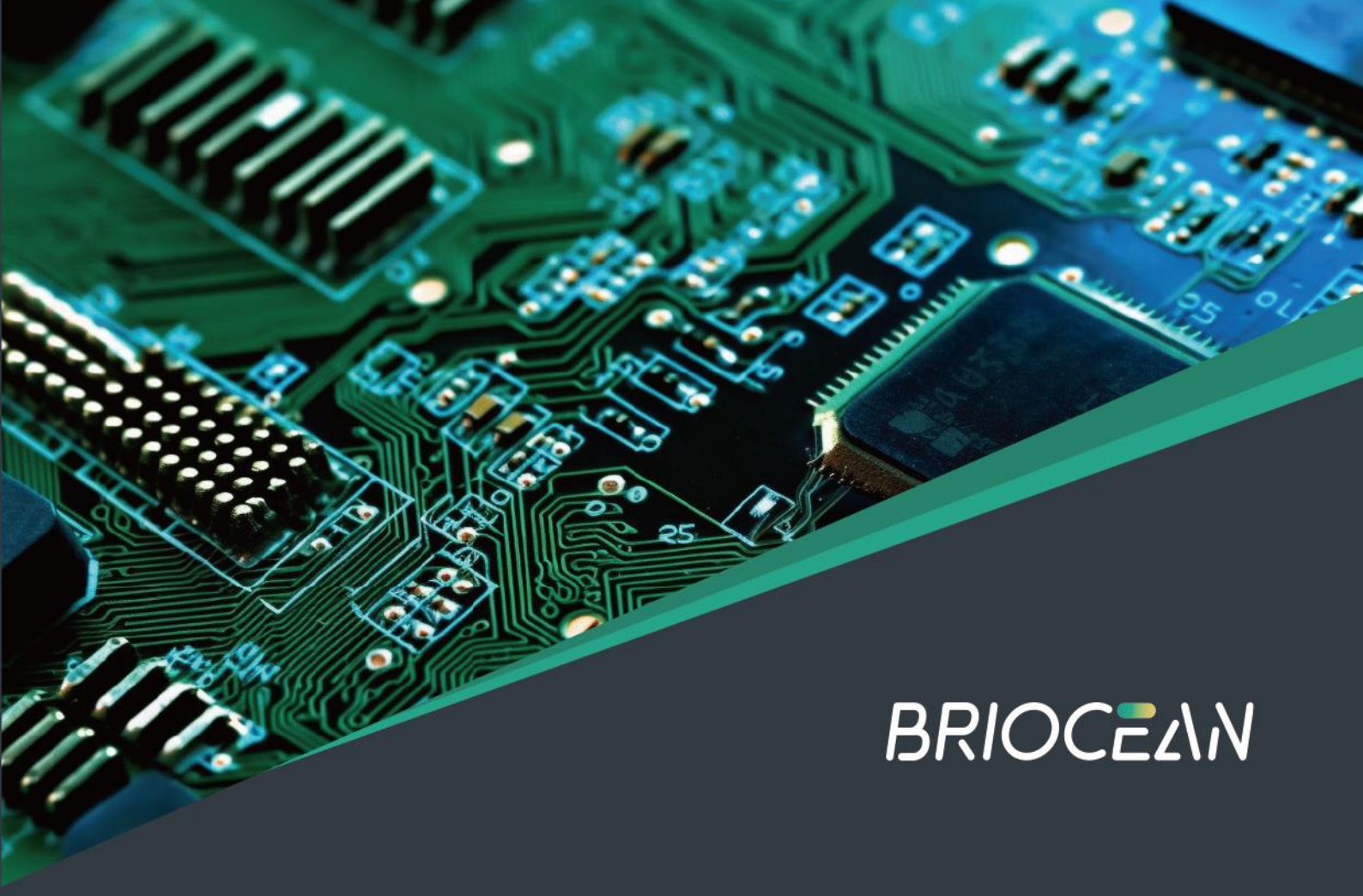
December 2023



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Working with over 10,000 global electronic component suppliers, Briocean strives to meet the various clients' demands on component shortages and cost savings. With the aim of providing clients with reliable and trackable procurment supply chain services, Briocean established one of the industry's most stringent Supplier Managmenet Systems and two world-class quality control centres based in Shenzhen and Hong Kong. Briocean's commitment to quality and reliability, ensures that every component we source, meets the highest standards.

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