

NOR Flash Memory For The Automotive Industry - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2024 - 2029)

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Abstracts

The NOR Flash Memory Market For The Automotive Industry is expected to grow from USD 0.91 billion in 2024 to USD 1.64 billion by 2029, at a CAGR of 12.52% during the forecast period (2024-2029).

The NOR flash memory sectors are witnessing a rapid growth rate due to the demand growth in multiple applications, from infotainment to instrument clusters.

Key Highlights

NOR flash is a memory and one of the types of non-volatile storage technologies. It is used for applications where individual bytes of data need to be written and read. The products are built to offer lower memory densities compared to NAND and enhance the power consumption in end-user devices.

Conventional automotive technology development usually emphasizes speed, safety, comfort, and energy-saving ability; however, the current focus has gradually shifted to developing a more innovative model capable of using new energy. As a mobile device on the road, the car used to be a separate individual without any interaction with any external device.

However, with the rapid development of mobile networks, this barrier has broken through, and the vehicle is no longer simply an isolated device on the road. The remote control of a car, or even the communication between vehicles or cars and devices (such as traffic signals,) is in the foreseeable future. The story of the Smart Car can be traced back to the early 90s and the Swiss watch company Swatch, where inventor Nicolas

Hayek was interested in the idea of developing an efficient and urbanized vehicle. He initially brought the idea to Volkswagen.

Thus, many EV manufacturers, such as BYD, Tesla, Nio, Xpeng, and Huawei, have been investing in smart car technologies, seeing them as major selling points for their EVs. Recently, in January 2024, Chinese electric vehicle (EV) giant BYD launched its Xuanji smart car system, seeking to catch up with rivals with functions such as automated parking and voice recognition.

Research and development costs are expected to increase with the growing end-user requirements for NOR flash memory. Vendors like Micron have invested USD 15 billion in constructing a new fabrication facility for memory manufacturing in Boise, Idaho.

In addition, the company is also planning to co-locate the new manufacturing fab with Micron's R&D center at the company's headquarters to enhance the technology deployment and improve time to market with operational efficiency to cater to industries like automotive, data centers, and memory applications in artificial intelligence and 5G. This indicates the costly research, development, and fabrication setup and drives the challenges.

Governments worldwide have been printing money and adopting quantitative easing measures to stimulate economies. This has worked over the past few years, but with looming inflation concerns, all those stimulus measures in the past might not work this time. The chip industry is in a super cycle, a period of prolonged expansion driven by robust demand.

At the same time, COVID-19 disruptions have brought wide-ranging rises in the cost of everything from logistics to raw materials. The sudden outbreak of the Russian invasion of Ukraine has sparked huge fluctuations in energy and materials markets, further adding to inflationary pressure. For instance, Macronix International Co., Ltd. NOR revenue in Q4 2023 declined by 29% compared to the same period in the previous year(2022) due to ongoing geopolitical tensions, war, and increased inflation.

NOR Flash Memory Market Trends

ADAS to be the Fastest Growing Application

Advanced driver-assistance systems (ADAS) utilize technologies to aid drivers in safely operating a vehicle. By utilizing a human-machine interface, ADAS enhances both car

and road safety. These systems rely on automated technology, including sensors and cameras, to identify potential obstacles or driver mistakes and react appropriately. ADAS empowers a vehicle to understand its environment and manage driving tasks like steering, braking, parking, etc. The importance of NOR Flash memory and devices is crucial in ADAS.

The need for NOR flash memory in automotive applications has increased recently. A prime example of this is ADAS, where the utilization of NOR Flash is projected to increase significantly. NOR flash memory is crucial in various advanced driver-assistance systems (ADAS) as it is integral to safety-critical systems. Its non-volatile nature, programmability, and speed make it a dependable and efficient choice. Allowing the host processor to run code directly from the flash memory eliminates the need to transfer it to an external DRAM.

ADAS has experienced a significant market expansion in the automotive industry. Currently, numerous ADAS applications use cameras, particularly backup cameras, to aid drivers in recognizing nearby dangers. Advanced sensing cameras offer even more sophisticated features, such as automated collision avoidance, lane changing, parking assistance, etc. Since sensing cameras necessitate more intricate processing than viewing cameras, highly efficient SoCs will be essential to sustain this advanced technology. The need for NOR Flash memory that offers both high density and high performance will persistently rise alongside the expansion in program size.

The rise in demand for safety and comfort in passenger cars due to the integration of ADAS has been significant. This growth is primarily fueled by government regulations in developed countries like the United States, Japan, China, and Germany mandating the implementation of ADAS for passenger safety.

Moreover, the increasing popularity of autonomous vehicles is also driving market expansion. For example, Intel predicts global car sales will exceed 101.4 million units by 2030, with autonomous vehicles expected to represent around 12% of car registrations by the same year. Alongside this shift, there has been a noticeable advancement in the development of essential tools and memory devices like NOR flash products to support the emergence of advanced driver assistance systems (ADAS).

Many countries in Asia Pacific, North America, and Europe have enforced rules mandating the integration of different ADAS technologies in cars to reduce road accidents. For instance, the European Union has introduced Vision Zero, a project to eliminate road fatalities by 2050. The governing body aims to decrease injuries and

deaths by 50% by 2030. It has made it compulsory to include essential safety features like ADAS and automatic emergency braking, creating substantial market prospects.

China to Hold Major Market Share

The demand for NOR flash memory in China's automotive industry is fueled by the country's growing automotive manufacturing sector. The increasing number of domestic automotive manufacturers and rising investments in automobiles are leading to the trend of incorporating advanced electronic systems into automobiles. This trend results in a higher requirement for NOR flash memory, which aids energy management, improves system dependability, and allows for compact designs in automotive electronics.

Similarly, the International Energy Agency (IEA) has projected that electric vehicle (EV) sales will make up approximately 65% of total car sales by 2030 in the Net Zero Scenario. To achieve this, there should be an annual growth rate of around 25% in EV sales from 2023 to 2030. China accounted for nearly 60% of all new electric car registrations worldwide in 2022. Within China, the proportion of electric cars in total domestic car sales increased from 16% in 2021 to 29% in 2022, surpassing the national target of a 20% sales share by 2025. Also, in 2023, Eight million electric vehicles were sold in China.

According to the CAAM (China Association of Automobile Manufacturers), in 2022, the total number of vehicle sales in China reached nearly 26.9 million, representing a 2.1% growth from the year before. This growth indicates the second consecutive year of increasing sales in 2022. As automotive sales increase, the demand for automobiles with advanced features grows, consequently driving the demand for NOR flash memory.

According to OICA, the motor vehicle production grew from 5% in 2019 to 7% in 2022. The Chinese government offers financial incentives to electric vehicle manufacturers to encourage their use. Vehicles that are completely electric and can travel over 400 km on a single charge qualify for subsidies of RMB 12,600 (around USD 2000). Electric vehicles ranging from 300-400 km are eligible for subsidies of RMB 9100 (approximately USD 1400).

The automotive NOR flash memories are extensively utilized in intelligent networking, motors, batteries, electronic control systems, intelligent cockpits, and ADAS for new

energy vehicles.

Autonomous vehicles incorporate advanced electronic systems and technologies that rely on Nor flash memory for various purposes, such as managing and storing the sensor data and facilitating real-time decision-making algorithms.

For instance, in March 2024, Baidu Inc., a provider of AI and internet technologies, introduced a 24/7 robot taxi service called Apollo Go in Wuhan, representing China's autonomous driving industry. This move is part of Baidu's strategic efforts to expand its autonomous ride-hailing service platform. Thus, these features require NOR flash memory for storing software applications, contributing to the demand for NOR flash memory.

NOR Flash Memory Industry Overview

The NOR flash memory market for the automotive industry is semi-consolidated with the presence of significant players like Winbond Electronics Corporation, Macronix International Co. Ltd, Infineon Technologies AG, Micron Technology Inc., and Gigadevice Semiconductor Inc. Players in the market are adopting partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

March 2024 - Giantec announced the launch of the latest Nor Flash functional safety solution, bringing a technological revolution to the automotive industry. Giantec's latest Nor Flash functional safety solution incorporates developed technology and strict quality control standards for higher safety and reliability.

September 2023 - Macronix International Co. Ltd announced that its OctaFlash memory line has received ISO 26262 ASIL D (Automotive Safety Integrity Level) certification from SGS T?V Saar, ensuring makers of automotive electronic systems that OctaFlash meets the highest level of safety in automotive electronics. This ISO 26262 ASIL D certification reflects how Macronix is building on our success both in OctaFlash's evolution as a powerful Flash-storage solution for the automotive market and in playing a key role in maximizing the functional safety of vehicles.

Additional Benefits:

The market estimate (ME) sheet in Excel format

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