Field Programmable Gate Array (Fpga) Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 161 pages | Mordor Intelligence

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Report description:

The global FPGA market was valued at USD 6958.1 Million in 2021, and it is expected to reach USD 11751.8 million by 2027, registering a CAGR of 8.32% over the period 2022-2027.

Key Highlights
Field programmable gate arrays (FPGAs) are integrated circuits having a programmable hardware fabric. Unlike ASICs or graphics processing units (GPUs), the circuitry inside an FPGA chip is not hard etched; it can be reprogrammed as required. This capability makes FPGAs a suitable alternative to ASICs, which require a long development time as well as a significant investment to design and fabricate.
The tech industry has been adopting FPGAs for machine learning and deep learning. In the last decade, Microsoft Research demonstrated one of the first use cases of AI on FPGAs as part of the company's efforts to accelerate web searches. FPGAs provide a combination of programmability, speed, and flexibility delivering performance without high cost and complexity to develop custom application-specific integrated circuits (ASICs). Microsoft's Bing search engine also uses FPGAs in production, indicating their value for deep learning applications. According to the company, Bing realized a 50% increase in throughput using FPGAs to accelerate search ranking.
FPGAs offer hardware customization with integrated AI and are able to be programmed for delivering behavior like an ASIC or a GPU. The reconfigurable, reprogrammable nature of an FPGA makes itself well suited for a rapidly evolving AI landscape, enabling designers to test algorithms quickly and get to market fast. FPGAs provide several advantages for deep learning applications and other AI workloads, including an enhanced performance with low latency and high throughput, efficiency considering value and cost, and low power consumption.
Over the last few years, the demand for portable devices increased rapidly. Hence, the semiconductor industry must limit the power consumption of chips. The ASIC/FPGA chip design industry is driven toward low power development due to the widespread

use of devices that require maximum speed and minimal power consumption, such as 5G smartphones, smart wearables, and healthcare devices that generate data continuously.
The demand for data centers, artificial intelligence (AI), and machine learning (ML) across enterprises, government, and educational entities is witnessing exponential growth due to the COVID-19 pandemic. This growth is positively impacting the demand for FPGAs. It is expected to maintain the same pace until the end of 2022, helping spread the impact and importance of FPGAs in various end-user industries.

Field Programmable Gate Array (FPGA) Market Trends

Increasing Demand for IoT to Drive the Market

Parallel execution is a key benefit of FPGAs, as a number of sensors, like humidity and temperature sensors, operate continuously. Since no time needs to be spent on looping and waiting for the delay, FPGAs tend to be more power-efficient for IoT.
According to the State of the IoT 2020 report, the number of IoT connection devices surpassed the number of non-IoT connection devices for the first time. Out of the 21.7 billion active connected devices worldwide, 11.7 billion (or 54%) were IoT device connections at the end of 2020. By 2025, this number is expected to be over 30 billion, nearly 4 IoT devices per person on average.
The demand for IoT is expected to increase even further during the forecast period, which signifies the growth in demand for semiconductors and other components. According to SEMI, the size of the semiconductor and sensor market for IoT devices is expected to reach USD 114.2 billion by 2025.
With the rapid increase in the number of IoT devices, chip requirement for building IoT devices is also expected to rise during the forecast period. Reducing energy consumption, combined with the miniaturization of chips, will be prioritized by manufacturers.
IoT promises to be a major driving force that would create significant innovation, facilitate new business models, and improve global society in multiple ways. Market vendors focus on developing FPGAs to integrate them into IoT devices and solutions. For instance, Intel FPGAs solutions, such as Intel Stratix 10, allow scalability and flexibility to address IoT requirements with inherent software and hardware programmability.

China to Drive the Market in Asia-Pacific

China has the world's largest semiconductor market. China consumes more than half of all semiconductors annually, both for internal use and potential export. As a result, the rapid expansion of Chinese demand boosted the FPGA market. On the other hand, domestic Chinese producers can only meet about 30% of their needs. As a result, the Chinese government urged its national champions and leading digital enterprises to develop their domestic semiconductor manufacturing capabilities to rebalance China's reliance on overseas semiconductor demand.
Moreover, 5G adoption is growing in momentum for both the network and device domains. According to the report published, Ericson mobility 5G subscriptions are estimated to reach 1 billion, two years earlier than 4G. Key factors include China's earlier engagement with 5G, compared to 4G, along with the timely availability of devices from several vendors. The Chinese telecom sector experienced rapid expansion in recent years, and it is predicted to continue to do so until 2025. The industry's development is primarily fueled by increased population, communication services, and smartphone use. Premium connectivity and content services in China account for the majority of the market growth in the country.
Furthermore, China is paving the way for the FPGA market to expand, as the country's demand is growing due to its leading position in the global manufacturing of consumer electronics gadgets. China is the world's largest manufacturing hub, producing 36% of the world's electronics, including smartphones, computers, cloud servers, and telecom infrastructure, establishing the

country as the global electronics supply chain's most important node. The popularity of artificial intelligence (AI) in China opened up a new development potential for the Chinese consumer electronics market. Smart homes and IoT (Internet of Things) are likely to be a significant development potential for manufacturers of FPGA in the next decade.
The demand for FPGA in China is growing continuously, owing to the increasing application area and use of FPGA in the end-user industry. For example. China's military UAV industry is robust and growing rapidly. Programmable Gate Arrays (FPGAs) alter the development of such UAV systems. FPGAs are used in high-level navigation control techniques, like path planning, Simultaneous Localization and Mapping (SLAM), and stereo vision, as well as safety-critical low-level activities, including system stability, state estimation, and peripheral interface. Furthermore, besides investigating FPGA usage in mission-critical functions, such as target tracking, communication, and obstacle avoidance.

Field Programmable Gate Array (FPGA) Market Competitor Analysis

The nature of competition within the industry can be studied in two different segments. Mainly due to the economies of scale and nature of the product offerings, the market space remains highly contested, and the cost-volume metrics favor companies that operate with low-fixed costs. Some key players in the market are Xilinx, Achronix Semiconductor Corp., Intel Corporation, and Quicklogic Corporation, among others. Some key recent developments in the market include:

February 2022 - QuickLogic Corporation announced that its PolarPro 3 family of low-power, SRAM-based FPGAs were available to solve semiconductor supply availability challenges. This highly flexible family features power consumption as low as 55uA and a tiny footprint in small packages, as well as die options.
November 2021 - Xilinx launched Alveo U55C, its most powerful accelerator card, purpose-built for HPC and big data workloads. The new Alveo U55C card is the company's most powerful Alveo accelerator card, offering the highest computer density and HBM capacity in the Alveo accelerator portfolio.

Additional Benefits:

The market estimate (ME) sheet in Excel format
3 months of analyst support

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