

Flexible Printed Circuit Board Market Assessment, By Type [Single-sided Flexible PCB, Double-sided Flexible PCB, Multi-layer Flexible PCB, Rigid Flexible PCB, Others], By Material [Polyimide, Polyester, Others], By Industry [Consumer Electronics, IT and Telecommunication, Automobile, Medical, Industrial, Others], By Region, Opportunities and Forecast, 2016-2030F

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# **Abstracts**

Global flexible printed circuit board market size was valued at USD 15.58 billion in 2022, expected to reach USD 35.59 billion in 2030, with a CAGR of 10.8% for the forecast period between 2023 and 2030. The flexible printed circuit board market is expanding rapidly. This expansion is driven mostly by rising demand in important consumer electronics, automotive, and healthcare sectors. The trend toward smaller, lighter, and more technologically advanced devices has raised the demand for FPCBs due to their flexibility, space-saving design, and enhanced electrical performance. Furthermore, developing technologies like flexible displays, IoT devices, and electric cars propel the market forward. The FPCB market will likely maintain its rising trend in the coming years, owing to continued advancements and increased acceptance of flexible circuitry.

The electronics manufacturing landscape 2023 sees a notable surge in adopting flexible PCBs, driven by their intrinsic advantages. Amid rising concerns over inflation, labor costs, and component shortages, the flexibility of PCBs has become a strategic asset. According to industry studies, the trend towards high-mix, low-volume production, amplified by global uncertainties, aligns with the versatility of flexible printed circuit boards. As companies explore reshoring options, flexible printed circuit boards'



adaptability and space efficiency contribute to establishing resilient and efficient supply chains. Moreover, the growing demand for sustainable electronics aligns with the eco-friendly attributes of flexible printed circuit boards, contributing to a reduced environmental footprint.

For instance, in April 2021, Siemens introduced PCBflow, a revolutionary cloud-based solution fostering secure collaboration between PCB designers and manufacturers. The pioneering software, driven by Valor NPI, accelerates the design-to-manufacturing transition, providing swift design for manufacturability analysis and handling over 1000 DFM checks. It enhances communication and optimizes designs for seamless integration.

Increase in Trend of Wearables Promote the Market's Growth

The trend in wearables significantly contributes to the growth of the flexible printed circuit board market, presenting lucrative opportunities for manufacturers in the upcoming period. As wearables continue to gain popularity in various industries, including health and fitness, smartwatches, and medical devices, the demand for flexible and lightweight electronic components rises. FPCBs, a key technology in flexible hybrid electronics (FHE), enable the bendable and compact designs required for wearable devices.

Manufacturers in the FPCB market can capitalize on this trend by aligning their production capabilities with the specific needs of wearable technology. Customization, miniaturization, and increased durability are essential for FPCBs catering to wearables. As the wearables market expands, FPCB manufacturers have the opportunity to innovate and address evolving design requirements, ensuring seamless integration into a wide range of wearable applications. Early collaboration with experienced FHE manufacturing partners, like Tapecon, can enhance the development and scalability of FPCBs, allowing manufacturers to stay at the forefront of this dynamic and growing market.

Move Towards Green Electronics Drive Demand for Flexible Printed Circuit Board Market

The growing emphasis on eco-friendly and sustainable electronics is a key driver behind the increasing demand for flexible printed circuit boards. FPCBs support this environmentally conscious trend by mitigating material waste and reducing energy consumption. Their flexible, lightweight design allows for precise material utilization,



eliminating unnecessary waste in the production process. Furthermore, FPCB manufacturing often employs energy-efficient methods, aligning with sustainability objectives. As environmental regulations and consumer preferences prioritize green technologies, FPCBs are becoming preferred over traditional rigid PCBs for their ability to contribute to more environmentally responsible and sustainable electronic products. It underscores their crucial role in advancing eco-friendly practices in the electronics industry.

For example, in November 2023, Elephantech secured USD 26.23 million in Series D financing, totaling USD 67.26 billion since inception. The funds will amplify mass production of P-Flex, an eco-friendly PCB, bolster global sales, and advance metal inkjet printing tech.

High-Density Interconnection Contribute to Flexible Printed Circuit Board Market

High-density interconnect technology is pivotal in shaping the landscape of the flexible printed circuit board market, offering manufacturers significant opportunities in the upcoming period. HDI PCBs, characterized by enhanced wiring density, use advanced features such as laser drilled microvias, stacked vias, staggered vias, and via-in-pad arrangements. High-density interconnect technology allows for more compact and smaller circuit boards, making it an ideal choice for applications with space constraints, particularly in the rapidly growing market of wearables and portable electronic devices.

HDI FPCBs facilitate the placement of more components on a single side, improving signal transmission and making them suitable for high-frequency applications like RF circuits. As consumer preferences shift towards smaller and more powerful devices, manufacturers leveraging HDI technology can meet these demands, ensuring cost-effectiveness, improved performance, and a competitive edge in dynamic flexible printed circuit board market.

Asia-Pacific Dominates Flexible Printed Circuit Board Market

Study reveals that Asia-Pacific commands a substantial portion of the global flexible printed circuit board market, propelled by robust electronics manufacturing ecosystems in countries like China, Japan, and South Korea. The region benefits from extensive technological infrastructure, skilled workforce, and significant investments in research and development. Furthermore, the substantial presence of major electronic device manufacturers amplifies the demand for FPCBs. This dominance is emphasized by the region's efficient large-scale production of FPCBs, establishing it as a pivotal player in



global market.

For instance, in June 2023, Japan accelerated semiconductor industry efforts with a potential JSR Corp buyout, TSMC's USD 7 billion chip plant, Micron's USD 3.5 billion investment, and Samsung's chip line. The state-backed fund supports growth plans.

Government Initiatives is Aiding the Growth of Flexible Printed Circuit Board Market

Globally, governments are actively supporting the growth of the flexible printed circuit board market. Their policies encourage innovation, expand manufacturing capabilities, and provide incentives for research and development, all of which contribute to building a strong, flexible printed circuit board ecosystem. Particularly in Asia, governments are offering tax benefits and infrastructure support to attract global electronics assembly leaders. Efforts are underway to stabilize tariffs and create an investor-friendly climate, ultimately boosting the competitiveness of flexible printed circuit board manufacturers globally. These initiatives are part of a broader strategy to establish countries as key players in the global electronics supply chain, emphasizing adaptability and innovation.

For instance, in December 2022, The Ministry of Environment, Forest, and Climate Change in India emphasized the formalization and regulation of the e-waste recycling sector. The E-Waste (Management) Rules, 2016, and the newly notified E-Waste (Management) Rules, 2022, introduce Extended Producer Responsibility (EPR) and set recycling targets, including the inclusion of 106 Electronic and Electrical Equipment (EEE) items. The rules aim to enhance environmental sustainability and safety in the dismantling and recycling e-waste, providing a comprehensive framework for flexible printed circuit board disposal and management.

#### Impact of COVID-19

The flexible printed circuit board market experienced a dual impact from COVID-19. Initially, the pandemic fueled demand for flexible printed circuit boards in the medical electronics sector owing to the increased need for medical devices. However, disruptions in global supply chain and trade tensions between the United States and China reduced demand for flexible PCBs, notably in Apple's supply chain. As the world transitions to the post-pandemic landscape, the FPCB market is anticipated to rebound, with an ongoing focus on medical applications and the rising demand for IoT devices and HDI technology.

#### Impact of Russia-Ukraine War



The Russia-Ukraine war has impacted the flexible printed circuit board market, revealing challenges in controlling technology diversion. As sanctions aim to restrict semiconductor exports to Russia, reports indicate Western semiconductors still appear in Russian weapons, raising concerns about illicit purchases and counterfeiting. The complexity of global supply chains, dual-use issues, and the longevity of chip use pose significant challenges. Efforts to control technology flow face hurdles, emphasizing the need for collaborative action. The war underscores the importance of addressing the broad range of challenges to prevent unintended applications of FPCBs in military systems, highlighting the industry's commitment to compliance.

Key Players Landscape and Outlook

Industry leaders like Siemens Aktiengesellschaft, Fujikura Printed Circuits Ltd., Sumitomo Electric Group, Nitto Denko Corporation, and Flexible Circuit Technologies, Inc., play a crucial role. These companies shape the market with their advanced technologies and wide market presence. The demand for FPCBs is rising, especially in consumer electronics and automotive areas. The market looks promising, with expectations of continued growth. Collaboration, technology advancements, and strategic partnerships among these key players are anticipated to drive innovation and meet the changing needs of the flexible printed circuit boards market.

In October 2023, Cicor's acquisition of STS Defence enhanced its position in highreliability electronics for aerospace and defense. The integration of STS Defence's capabilities strengthens Cicor's ability to provide innovative solutions, contributing to its competitiveness in flexible printed circuit board market.



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\*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work.

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