

Panel-Level Packaging Market Forecasts to 2034 – Global Analysis By Packaging Format (Fan-Out Panel-Level Packaging, Fan-In Panel-Level Packaging, Panel-Level Chip-Scale Packaging, Panel-Level System-in-Package, Panel-Level Embedded Die Packaging and Other Packaging Formats), Panel Substrate, Panel Size, Package Configuration, End User and Geography

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Abstracts

According to Statistics MRC, the Global Panel-Level Packaging Market is accounted for \$0.5 billion in 2026 and is expected to reach \$2.8 billion by 2034 growing at a CAGR of 24.0% during the forecast period. Panel-Level Packaging is an advanced semiconductor packaging approach in which semiconductor dies are assembled and interconnected on large rectangular or square panels rather than individual circular wafers. Larger processing areas can potentially increase packaging throughput and improve material utilization for certain applications. The technology supports fan-out packaging and other advanced package architectures requiring high-density interconnections and heterogeneous integration. Panel-level processes may include redistribution layer formation, molding, die placement, lithography, metallization, and singulation. Applications include high-performance computing, mobile devices, automotive electronics, and other compact electronic systems. Growing demand for advanced packaging and increasing pressure to improve packaging economics are supporting interest in panel-based approaches. Development focuses on panel warpage control, alignment accuracy, process uniformity, yield, equipment compatibility, and scalable manufacturing.

Market Dynamics

Driver:

Growing demand for cost-effective advanced packaging

Increasing demand for cost-effective advanced packaging solutions is driving adoption of panel-level packaging that offers higher throughput and lower cost per unit compared to wafer-level approaches. Growing panel sizes enable more units per panel, improving manufacturing efficiency and reducing costs. Rising demand for fan-out packaging for mobile and consumer applications supports market expansion. Growing complexity of advanced packaging requires larger substrates to accommodate multi-die configurations. Panel-level packaging enables cost-effective production of large packages for AI and high-performance computing.

Restraint:

Process complexity and yield challenges

High process complexity of panel-level packaging, including handling of large panels and achieving uniform processing, presents significant adoption barriers. Yield challenges associated with panel warpage, die shift, and defect control affect production economics. Limited availability of qualified equipment and process expertise constrains adoption. High capital investment requirements for panel-level equipment limit market entry. Extended development cycles for process optimization delay time-to-market.

Opportunity:

Glass substrate adoption and large-format panels

Growing adoption of glass substrates for panel-level packaging presents significant opportunities for market expansion. Development of large-format panels enables cost-effective production of large packages for AI and data center applications. Expansion of panel-level packaging to new applications creates market opportunities. Advances in equipment and process technology improve throughput and yield. Growing ecosystem of panel-level packaging standards supports market development.

Threat:

Competition from wafer-level packaging

Competition from wafer-level packaging approaches may limit panel-level packaging

adoption in certain applications. Economic pressures may delay investment in panel-level capacity. Technology complexity may slow adoption timelines. Geopolitical tensions may disrupt supply chains for panel-level equipment and materials. Rapid technology evolution creates obsolescence risk for early adopters.

Covid-19 Impact:

The COVID-19 pandemic accelerated demand for advanced packaging solutions for 5G, AI, and high-performance computing applications, driving investment in panel-level packaging technology. Supply chain disruptions highlighted the importance of cost-effective packaging solutions for maintaining competitiveness. The post-pandemic period has witnessed increased investment in panel-level packaging capacity, supporting market growth. Growing government support for semiconductor manufacturing continues driving adoption. Panel-level packaging is increasingly recognized as critical for cost-effective advanced packaging.

The fan-out panel-level packaging segment is expected to be the largest during the forecast period

The fan-out panel-level packaging segment is expected to account for the largest market share during the forecast period as fan-out packaging offers high I/O density and design flexibility for diverse applications. Growing adoption for mobile, consumer, and automotive applications drives market expansion. Advances in fan-out panel-level packaging technology improve yield and performance. Established process knowledge and infrastructure support segment leadership. Fan-out panel-level packaging is the primary driver of panel-level packaging adoption.

The glass substrates segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the glass substrates segment is predicted to witness the highest growth rate driven by increasing adoption for high-density panel-level packaging. Glass substrates offer superior dimensional stability and finer feature capability compared to organic substrates. Growing demand for large-format panels for AI applications supports segment growth. Advances in glass handling and processing technology improve yield and throughput. Glass substrates are increasingly preferred for advanced panel-level packaging.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share owing to dominant semiconductor packaging base in Taiwan, South Korea, and Japan. The region hosts the world's leading OSAT and IDM companies with extensive panel-level packaging development. Major semiconductor manufacturers drive substantial demand for panel-level packaging services. Government support for semiconductor manufacturing reinforces regional market leadership. Continued advanced packaging capacity expansion drives market growth.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR driven by continued advanced packaging capacity expansion and technology adoption. Taiwan and South Korea are expanding panel-level packaging capacity for advanced applications. China is investing in domestic panel-level packaging capabilities. Growing investment in AI and high-performance computing accelerates demand for panel-level packaging. Regional supply chain development supports market growth.

Key players in the market

Some of the key players in the Panel-Level Packaging Market include TSMC, Samsung Electronics Co., Ltd., Intel Corporation, ASE Technology Holding Co., Ltd., Amkor Technology, Inc., Powertech Technology Inc., ChipMOS TECHNOLOGIES INC., Deca Technologies, JCET Group Co., Ltd., Shinko Electric Industries Co., Ltd., Unimicron Technology Corporation, AT&S Austria Technologie & Systemtechnik AG, LPKF Laser & Electronics SE, ASMPT Limited, and Besi N.V.

Key Developments:

In August 2026, ASE Technology Holding Co., Ltd. announced the qualification of its fan-out panel-level packaging process for AI accelerator applications, enabling cost-effective production of large multi-die packages.

In April 2026, Amkor Technology, Inc. expanded its panel-level packaging capacity in Asia to meet growing demand for advanced packaging services.

In December 2025, Deca Technologies introduced a new adaptive patterning

technology for panel-level packaging, improving yield and reducing die shift.

In July 2025, Powertech Technology Inc. announced the launch of panel-level chip-scale packaging services for mobile and consumer applications.

Packaging Formats Covered:

Fan-Out Panel-Level Packaging

Fan-In Panel-Level Packaging

Panel-Level Chip-Scale Packaging

Panel-Level System-in-Package

Panel-Level Embedded Die Packaging

Other Packaging Formats

Panel Substrates Covered:

Organic Substrates

Glass Substrates

Reconstituted Molded Panels

Ceramic Substrates

Metal-Based Panels

Other Panel Substrates

Panel Sizes Covered:

300 mm-Class Panels

500 mm-Class Panels

600 mm-Class Panels

700 mm-Class Panels

Large-Format Panels

Package Configurations Covered:

Single-Die Packages

Multi-Die Packages

Chiplet Packages

Memory-Logic Packages

Heterogeneous Packages

Other Package Configurations

End Users Covered:

Foundries

Outsourced Semiconductor Assembly and Test Providers

Integrated Device Manufacturers

Fabless Semiconductor Companies

Electronics Manufacturing Service Providers

Other End Users

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of Africa

What our report offers:

Market share assessments for the regional and country-level segments

Strategic recommendations for the new entrants

Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

Strategic recommendations in key business segments based on the market estimations

Competitive landscaping mapping the key common trends

Company profiling with detailed strategies, financials, and recent developments

Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) are also represented in the same manner as above.

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