

Global Single-crystal Diamond (SCD) Substrates Market Growth 2026-2032

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Abstracts

The global Single-crystal Diamond (SCD) Substrates market size is predicted to grow from US\$ 6.35 million in 2025 to US\$ 49.52 million in 2032; it is expected to grow at a CAGR of 32.9% from 2026 to 2032.

Single-crystal diamond (SCD) wafers/substrates are freestanding, device-processable diamond substrates that maintain single crystallinity across the usable area (commonly specified by orientation such as (100)/(111), off-axis, and defect metrics), and are delivered with semiconductor-grade geometry and surface quality (thickness/flatness/polish, controlled damage layer) plus controlled impurity/defect content to meet ?electronic-grade? or ?quantum-grade? performance targets. In industry positioning, electronic-grade SCD is explicitly linked to next-generation semiconductors, radiation/particle detectors, and quantum applications, while doped/epi-ready SCD substrates enable vertical device structures; this definition excludes polycrystalline CVD heat spreaders and non-wafer ?plates? that lack wafer/substrate specifications.

Single-crystal diamond wafers enable critical advances in both RF power technology used for 5G communications and satellites; as well as in the power electronics used in electric vehicles. Heat dissipation has emerged as the key limiting factor in making power electronics and RF power applications ever more efficient in everything from satellites, 5G base stations, electric cars, renewable energy generation and transmission, LIDARs, etc. Using modern wafer bonding technologies, single-crystal diamond (SCD) wafers can be produced combining the ultimate thermal substrate (that is, diamond) with any proven semiconductor such as Si, SiC, GaN, etc.

The single-crystal diamond (SCD) wafers are still early-commercial: supply is

constrained by (a) the challenge of scaling single-crystal growth to wafer size with acceptable defect density and stress control, and (b) the cost/throughput limits of diamond precision processing (flatness, subsurface damage control, polishing) and subsequent qualification in semiconductor manufacturing. The industry's technology trajectory is nevertheless clear: (1) wafer size scaling is progressing from inch-class demonstrations toward more manufacturable formats (2-inch class being repeatedly highlighted as an industrial stepping stone; 100 mm monolithic wafer announcements have become an important proof point), (2) process route convergence is moving from mosaic as a bridging solution toward higher-yield wafer-scale growth and singulation/processing, and (3) application pull is shifting from R&D-heavy quantum/detector uses toward higher-volume thermal/bondable integration and power/RF platforms, which typically demand tighter wafer-level specifications, repeatability, and a more standardized supply chain. Over 2025-2032, expect competition to focus on three levers: scalable wafer growth (homo/heteroepitaxy), wafer fabrication methods that reduce kerf loss and improve reuse economics, and device-ready surface/wafer specifications (bondability, orientation, uniformity) that shorten customer qualification cycles in packaging and high-power electronics.

The global key companies in the Single-crystal Diamond Wafers market include Orbray, Diamond Foundry Inc, Element Six (E6), EDP Corporation, Advent Diamond, Coherent, Compound Semiconductor (Xiamen) Technology and Great Lakes Crystal Technologies (GLCT), etc. In 2025, the three largest players accounted for approximately 72% of revenue. The single-crystal diamond (SCD) wafers are still early-commercial, and more and more companies are entering this field. Potential entrants include Diamfab, WD Advanced Materials (WDAM), HiQuTe Diamond, Applied Diamond Inc, Chongqing Origin Stone Element Science and Technology Development and Ningbo Crysdiam Technology, etc.

LP Information, Inc. (LPI) ' newest research report, the 'Single-crystal Diamond (SCD) Substrates Industry Forecast' looks at past sales and reviews total world Single-crystal Diamond (SCD) Substrates sales in 2025, providing a comprehensive analysis by region and market sector of projected Single-crystal Diamond (SCD) Substrates sales for 2026 through 2032. With Single-crystal Diamond (SCD) Substrates sales broken down by region, market sector and sub-sector, this report provides a detailed analysis in US\$ millions of the world Single-crystal Diamond (SCD) Substrates industry.

This Insight Report provides a comprehensive analysis of the global Single-crystal Diamond (SCD) Substrates landscape and highlights key trends related to product segmentation, company formation, revenue, and market share, latest development, and

M&A activity. This report also analyzes the strategies of leading global companies with a focus on Single-crystal Diamond (SCD) Substrates portfolios and capabilities, market entry strategies, market positions, and geographic footprints, to better understand these firms' unique position in an accelerating global Single-crystal Diamond (SCD) Substrates market.

This Insight Report evaluates the key market trends, drivers, and affecting factors shaping the global outlook for Single-crystal Diamond (SCD) Substrates and breaks down the forecast by Size, by Application, geography, and market size to highlight emerging pockets of opportunity. With a transparent methodology based on hundreds of bottom-up qualitative and quantitative market inputs, this study forecast offers a highly nuanced view of the current state and future trajectory in the global Single-crystal Diamond (SCD) Substrates.

This report presents a comprehensive overview, market shares, and growth opportunities of Single-crystal Diamond (SCD) Substrates market by product type, application, key manufacturers and key regions and countries.

Segmentation by Size:

2-inch (50 mm)

3-inch (75 mm)

4-inch (100 mm)

Below 2-inch

Segmentation by Process:

Heteroepitaxial HPHT

Homoepitaxy HPHT

Others

Segmentation by Grade:

Quantum-grade Diamond Wafer

Electronic/Power-grade Wafer

Thermal/Bonding-grade Wafer

Detector-grade Wafer

Segmentation by Application:

RF Power, 5G & Satellites

Power Electronics

Cloud & AI Compute

Quantum Technologies

Others

This report also splits the market by region:

Americas

United States

Canada

Mexico

Brazil

APAC

China

Japan

Korea

Southeast Asia

India

Australia

Europe

Germany

France

UK

Italy

Russia

Middle East & Africa

Egypt

South Africa

Israel

Turkey

GCC Countries

The below companies that are profiled have been selected based on inputs gathered from primary experts and analysing the company's coverage, product portfolio, its market penetration.

Diamond Foundry Inc

Orbray (KENZAN Diamond)

Diamond Materials

AKHAN Semiconductor

Diamfab

Chongqing Origin Stone Element Science and Technology Development

Applied Diamond Inc

Element Six

Compound Semiconductor (Xiamen) Technology

Key Questions Addressed in this Report

What is the 10-year outlook for the global Single-crystal Diamond (SCD) Substrates market?

What factors are driving Single-crystal Diamond (SCD) Substrates market growth, globally and by region?

Which technologies are poised for the fastest growth by market and region?

How do Single-crystal Diamond (SCD) Substrates market opportunities vary by end market size?

How does Single-crystal Diamond (SCD) Substrates break out by Size, by Application?

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