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Global Single-crystal Diamond Wafers Supply, Demand and Key Producers, 2026-2032

https://marketpublishers.com/r/G9BA3C99B260EN.html
Date: April 2026
Pages: 108
Price: US$ 4,480.00 (Single User License)
ID: G9BA3C99B260EN

Abstracts

The global Single-crystal Diamond Wafers market size is expected to reach $ 47.71 million by 2032, rising at a market growth of 31.0% CAGR during the forecast period (2026-2032).

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

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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.

This report studies the global Single-crystal Diamond Wafers production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Single-crystal Diamond Wafers and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Single-crystal Diamond Wafers that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Single-crystal Diamond Wafers total production and demand, 2021-2032,

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(Pieces)
Global Single-crystal Diamond Wafers total production value, 2021-2032, (USD Million)
Global Single-crystal Diamond Wafers production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Pieces), (based on production site)
Global Single-crystal Diamond Wafers consumption by region & country, CAGR, 2021-2032 & (Pieces)
U.S. VS China: Single-crystal Diamond Wafers domestic production, consumption, key domestic manufacturers and share
Global Single-crystal Diamond Wafers production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Pieces)
Global Single-crystal Diamond Wafers production by Size, production, value, CAGR, 2021-2032, (USD Million) & (Pieces)
Global Single-crystal Diamond Wafers production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Pieces)

This report profiles key players in the global Single-crystal Diamond Wafers market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Orbray, Element Six (E6), Diamond Foundry (DF), Advent Diamond, Compound Semiconductor (Xiamen) Technology, Coherent, EDP Corporation, Great Lakes Crystal Technologies (GLCT), etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Single-crystal Diamond Wafers market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Pieces) and average price (US$/Piece) by manufacturer, by Size, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Single-crystal Diamond Wafers Market, By Region:

United States

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China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Single-crystal Diamond Wafers Market, Segmentation by Size:

2-inch (50 mm)

3-inch (75 mm)

4-inch (100 mm)

Below 2-inch

Global Single-crystal Diamond Wafers Market, Segmentation by Process:

Heteroepitaxial HPHT

Homoepitaxy HPHT

Others

Global Single-crystal Diamond Wafers Market, Segmentation by Grade:

Quantum-grade Diamond Wafer

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Electronic/Power-grade Wafer

Thermal/Bonding-grade Wafer

Detector-grade Wafer

Global Single-crystal Diamond Wafers Market, Segmentation by Application:

RF Power, 5G & Satellites

Power Electronics

Cloud & AI Compute

Quantum Technologies

Others

Companies Profiled:

Orbray

Element Six (E6)

Diamond Foundry (DF)

Advent Diamond

Compound Semiconductor (Xiamen) Technology

Coherent

EDP Corporation

Great Lakes Crystal Technologies (GLCT)

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Key Questions Answered:

1. How big is the global Single-crystal Diamond Wafers market?
2. What is the demand of the global Single-crystal Diamond Wafers market?
3. What is the year over year growth of the global Single-crystal Diamond Wafers market?
4. What is the production and production value of the global Single-crystal Diamond Wafers market?
5. Who are the key producers in the global Single-crystal Diamond Wafers market?
6. What are the growth factors driving the market demand?

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Contents

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5 MARKET ANALYSIS BY SIZE

6 MARKET ANALYSIS BY PROCESS

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7 MARKET ANALYSIS BY GRADE

8 MARKET ANALYSIS BY APPLICATION

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9 COMPANY PROFILES

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info@marketpublishers.com

10 INDUSTRY CHAIN ANALYSIS

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List Of Tables

LIST OF TABLES

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List Of Figures

LIST OF FIGURES

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