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Quantum Computing Semiconductor Market Forecasts to 2034 – Global Analysis By Component (Hardware, Software, and Services), Technology Type, Material, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Quantum Computing Semiconductor Market is accounted for $1.8 billion in 2026 and is expected to reach $10.7 billion by 2034, growing at a CAGR of 25.0% during the forecast period. Quantum computing semiconductors refer to the specialized hardware, software, and services that enable quantum computing, leveraging quantum mechanical phenomena to perform computations that are exponentially faster than classical computers for certain problems. These components encompass hardware including quantum processors, control and readout electronics, and cryogenic systems, along with quantum algorithms, compilers, development kits, operating systems, middleware, and cloud-based quantum computing services.

Market Dynamics:

Driver:

Growing demand for solving complex computational problems

The increasing demand for solving complex computational problems that are intractable for classical computers serves as a primary catalyst for the quantum computing semiconductor market. Industries including finance, healthcare, pharmaceuticals, materials science, and logistics face computational challenges that quantum computers can address more efficiently than classical approaches. Quantum computing enables optimization, simulation, machine learning, and cryptography applications that require

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processing capabilities beyond classical systems. The growing recognition of quantum computing's potential to solve previously intractable problems drives investment in quantum hardware development and deployment. As organizations seek competitive advantages through quantum computing capabilities, the demand for quantum computing semiconductors continues to grow.

Restraint:

Extreme technical complexity and high implementation costs

The quantum computing semiconductor market faces significant challenges from extreme technical complexity and high implementation costs that limit accessibility and commercial viability. Quantum processors require operation at extremely low temperatures near absolute zero, necessitating complex cryogenic systems and specialized infrastructure. Maintaining quantum coherence and managing error rates requires sophisticated control and readout electronics. The development of quantum hardware requires substantial investment in research, specialized facilities, and expert talent. These technical and cost barriers limit the availability of quantum computing resources and restrict adoption primarily to large organizations, research institutions, and government-funded programs.

Opportunity:

Advancements in quantum error correction and qubit scaling

The ongoing advancements in quantum error correction techniques and scalable qubit fabrication present significant opportunities for the quantum computing semiconductor market. Improvements in error correction enable longer coherence times and more reliable quantum computation, making quantum computers more practical for commercial applications. Advances in qubit fabrication, including semiconductor-based qubits and superconducting technology, support scaling to larger qubit counts necessary for meaningful quantum advantage. The development of fault-tolerant quantum computing architectures could unlock broad commercial applications across industries. As the technology matures and becomes more accessible, the market for quantum computing semiconductors is expected to expand significantly.

Threat:

Competition from alternative quantum computing approaches

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The quantum computing semiconductor market faces threats from competition between different quantum computing approaches and technologies that could fragment the market and delay commercialization. Various competing technologies including superconducting qubits, ion traps, photonics, topological qubits, and neutral atoms are pursuing quantum advantage through different physical implementations. The lack of convergence on a dominant technology platform creates uncertainty for investment and ecosystem development. Additionally, advances in classical computing and AI could address some problems previously considered suitable for quantum computers, potentially reducing the perceived need for quantum solutions.

Covid-19 Impact:

The COVID-19 pandemic significantly impacted the quantum computing semiconductor market by accelerating interest in computational research and digital transformation while disrupting supply chains and research activities. The pandemic highlighted the importance of computational capabilities for drug discovery, vaccine development, and complex systems modeling, increasing interest in quantum computing's potential. Supply chain disruptions affected specialized component availability and laboratory operations. However, the shift toward cloud-based quantum computing services and remote access enabled continued research and development. As organizations recognized the importance of advanced computational capabilities, investment in quantum computing continued, supporting long-term market growth despite short-term disruptions.

The superconducting quantum chips segment is expected to be the largest during the forecast period

The superconducting quantum chips segment is expected to account for the largest market share during the forecast period, driven by their current dominance as the most mature and widely adopted quantum computing technology, with leading quantum computing companies leveraging superconducting qubits for commercial quantum systems. Superconducting qubits offer relatively fast gate speeds and established fabrication techniques compatible with semiconductor manufacturing. As the most advanced quantum computing approach with demonstrated commercial systems, superconducting quantum chips maintain the largest market share.

The silicon/semiconductor quantum chips segment is expected to have the highest CAGR during the forecast period

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Over the forecast period, the silicon/semiconductor quantum chips segment is predicted to witness the highest growth rate, driven by their potential for scalability, compatibility with existing semiconductor manufacturing infrastructure, and potential for integration with classical electronics for hybrid quantum-classical computing systems. Silicon quantum chips leverage established semiconductor fabrication processes, enabling cost-effective scaling and integration. As the technology matures and scalability advantages become more apparent, the adoption of silicon-based quantum chips continues to accelerate.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, driven by the presence of leading quantum computing companies, significant government and private investment in quantum research, strong academic and research infrastructure, and early commercialization of quantum technologies. The region's leadership in technology innovation and quantum computing research supports market dominance. Major quantum computing companies and research institutions in the United States are at the forefront of quantum hardware development and commercialization.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, fueled by significant government investment in quantum technology research, growing semiconductor manufacturing capabilities, increasing academic research activities, and strategic initiatives for quantum technology development across countries like China, Japan, South Korea, India, and Singapore. The region's strength in semiconductor manufacturing and electronics production supports quantum hardware development. Governments in Asia Pacific are supporting quantum technology development through investment and strategic initiatives.

Key players in the market

Some of the key players in Quantum Computing Semiconductor Market include IBM Corporation, Atom Computing, Google LLC, Rigetti Computing, Intel Corporation, D-Wave Systems Inc., Microsoft Corporation, Quantinuum, GlobalFoundries, IonQ Inc., Pasqal, IQM Quantum Computers, Infleqtion, Diraq, and QuantWare.

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Key Developments:

In March 2025, IBM Corporation announced its latest quantum processor featuring improved coherence times and reduced error rates. The processor represents a significant advancement toward fault-tolerant quantum computing with enhanced performance for commercial applications.

In February 2025, Google LLC unveiled advancements in its quantum computing platform, demonstrating error correction capabilities that bring practical quantum computing closer to reality. The development represents a milestone in quantum error correction research.

Components Covered:

- Hardware
- Software
- Services

Technology Types Covered:

- Superconducting Quantum Chips
- Topological Quantum Chips
- Photonic Quantum Chips
- Ion Trap Quantum Chips
- Silicon/Semiconductor Quantum Chips
- Other Emerging Technologies

Materials Covered:

- Silicon (Si)

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Germanium (Ge)

Superconducting Materials

Other Materials

Applications Covered:

Below 30 Qubit Quantum Computers

30–50 Qubit Quantum Computers

50–60 Qubit Quantum Computers

Above 60 Qubit Quantum Computers

Quantum Simulators

End Users Covered:

Banking, Financial Services, and Insurance (BFSI)

Healthcare and Pharmaceuticals

Government and Defense

Automotive and Aerospace

Chemicals and Energy

IT and Telecommunications

Other End Users

Regions Covered:

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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

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- 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

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- 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

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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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Contents

1 EXECUTIVE SUMMARY

1.1 Market Snapshot and Key Highlights
1.2 Growth Drivers, Challenges, and Opportunities
1.3 Competitive Landscape Overview
1.4 Strategic Insights and Recommendations

2 RESEARCH FRAMEWORK

2.1 Study Objectives and Scope
2.2 Stakeholder Analysis
2.3 Research Assumptions and Limitations
2.4 Research Methodology
  2.4.1 Data Collection (Primary and Secondary)
  2.4.2 Data Modeling and Estimation Techniques
  2.4.3 Data Validation and Triangulation
  2.4.4 Analytical and Forecasting Approach

3 MARKET DYNAMICS AND TREND ANALYSIS

3.1 Market Definition and Structure
3.2 Key Market Drivers
3.3 Market Restraints and Challenges
3.4 Growth Opportunities and Investment Hotspots
3.5 Industry Threats and Risk Assessment
3.6 Technology and Innovation Landscape
3.7 Emerging and High-Growth Markets
3.8 Regulatory and Policy Environment
3.9 Impact of COVID-19 and Recovery Outlook

4 COMPETITIVE AND STRATEGIC ASSESSMENT

4.1 Porter's Five Forces Analysis
  4.1.1 Supplier Bargaining Power
  4.1.2 Buyer Bargaining Power
  4.1.3 Threat of Substitutes
  4.1.4 Threat of New Entrants

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4.1.5 Competitive Rivalry
4.2 Market Share Analysis of Key Players
4.3 Product Benchmarking and Performance Comparison

5 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY COMPONENT

5.1 Hardware
5.1.1 Quantum Processors (QPUs)
5.1.2 Control and Readout Electronics
5.1.3 Cryogenic Systems and Refrigerators
5.2 Software
5.2.1 Quantum Algorithms and Application Software
5.2.2 Quantum Compilers and Development Kits
5.2.3 Operating Systems and Middleware
5.3 Services
5.3.1 Professional and Consulting Services
5.3.2 Cloud-Based Quantum Computing Services

6 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY TECHNOLOGY TYPE

6.1 Superconducting Quantum Chips
6.2 Topological Quantum Chips
6.3 Photonic Quantum Chips
6.4 Ion Trap Quantum Chips
6.5 Silicon/Semiconductor Quantum Chips
6.6 Other Emerging Technologies

7 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY MATERIAL

7.1 Silicon (Si)
7.2 Germanium (Ge)
7.3 Superconducting Materials
7.4 Other Materials

8 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY APPLICATION

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8.1 Below 30 Qubit Quantum Computers
8.2 30–50 Qubit Quantum Computers
8.3 50–60 Qubit Quantum Computers
8.4 Above 60 Qubit Quantum Computers
8.5 Quantum Simulators

9 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY END USER

9.1 Banking, Financial Services, and Insurance (BFSI)
9.2 Healthcare and Pharmaceuticals
9.3 Government and Defense
9.4 Automotive and Aerospace
9.5 Chemicals and Energy
9.6 IT and Telecommunications
9.7 Other End Users

10 GLOBAL QUANTUM COMPUTING SEMICONDUCTOR MARKET, BY GEOGRAPHY

10.1 North America
  10.1.1 United States
  10.1.2 Canada
  10.1.3 Mexico
10.2 Europe
  10.2.1 United Kingdom
  10.2.2 Germany
  10.2.3 France
  10.2.4 Italy
  10.2.5 Spain
  10.2.6 Netherlands
  10.2.7 Belgium
  10.2.8 Sweden
  10.2.9 Switzerland
  10.2.10 Poland
  10.2.11 Rest of Europe
10.3 Asia Pacific
  10.3.1 China
  10.3.2 Japan
  10.3.3 India

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10.3.4 South Korea
10.3.5 Australia
10.3.6 Indonesia
10.3.7 Thailand
10.3.8 Malaysia
10.3.9 Singapore
10.3.10 Vietnam
10.3.11 Rest of Asia Pacific
10.4 South America
10.4.1 Brazil
10.4.2 Argentina
10.4.3 Colombia
10.4.4 Chile
10.4.5 Peru
10.4.6 Rest of South America
10.5 Rest of the World (RoW)
10.5.1 Middle East
10.5.1.1 Saudi Arabia
10.5.1.2 United Arab Emirates
10.5.1.3 Qatar
10.5.1.4 Israel
10.5.1.5 Rest of Middle East
10.5.2 Africa
10.5.2.1 South Africa
10.5.2.2 Egypt
10.5.2.3 Morocco
10.5.2.4 Rest of Africa

11 STRATEGIC MARKET INTELLIGENCE

11.1 Industry Value Network and Supply Chain Assessment
11.2 White-Space and Opportunity Mapping
11.3 Product Evolution and Market Life Cycle Analysis
11.4 Channel, Distributor, and Go-to-Market Assessment

12 INDUSTRY DEVELOPMENTS AND STRATEGIC INITIATIVES

12.1 Mergers and Acquisitions
12.2 Partnerships, Alliances, and Joint Ventures

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12.3 New Product Launches and Certifications
12.4 Capacity Expansion and Investments
12.5 Other Strategic Initiatives

13 COMPANY PROFILES

13.1 IBM Corporation
13.2 Atom Computing
13.3 Google LLC
13.4 Rigetti Computing
13.5 Intel Corporation
13.6 D-Wave Systems Inc.
13.7 Microsoft Corporation
13.8 Quantinuum
13.9 GlobalFoundries
13.10 IonQ, Inc.
13.11 Pasqal
13.12 IQM Quantum Computers
13.13 Infleqtion
13.14 Diraq
13.15 QuantWare

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List Of Tables

LIST OF TABLES

Table 1 Global Quantum Computing Semiconductor Market Outlook, By Region (2023-2034) ($MN)
Table 2 Global Quantum Computing Semiconductor Market Outlook, By Component (2023-2034) ($MN)
Table 3 Global Quantum Computing Semiconductor Market Outlook, By Hardware (2023-2034) ($MN)
Table 4 Global Quantum Computing Semiconductor Market Outlook, By Quantum Processors (QPUs) (2023-2034) ($MN)
Table 5 Global Quantum Computing Semiconductor Market Outlook, By Control and Readout Electronics (2023-2034) ($MN)
Table 6 Global Quantum Computing Semiconductor Market Outlook, By Cryogenic Systems and Refrigerators (2023-2034) ($MN)
Table 7 Global Quantum Computing Semiconductor Market Outlook, By Software (2023-2034) ($MN)
Table 8 Global Quantum Computing Semiconductor Market Outlook, By Quantum Algorithms and Application Software (2023-2034) ($MN)
Table 9 Global Quantum Computing Semiconductor Market Outlook, By Quantum Compilers and Development Kits (2023-2034) ($MN)
Table 10 Global Quantum Computing Semiconductor Market Outlook, By Operating Systems and Middleware (2023-2034) ($MN)
Table 11 Global Quantum Computing Semiconductor Market Outlook, By Services (2023-2034) ($MN)
Table 12 Global Quantum Computing Semiconductor Market Outlook, By Professional and Consulting Services (2023-2034) ($MN)
Table 13 Global Quantum Computing Semiconductor Market Outlook, By Cloud-Based Quantum Computing Services (2023-2034) ($MN)
Table 14 Global Quantum Computing Semiconductor Market Outlook, By Technology Type (2023-2034) ($MN)
Table 15 Global Quantum Computing Semiconductor Market Outlook, By Superconducting Quantum Chips (2023-2034) ($MN)
Table 16 Global Quantum Computing Semiconductor Market Outlook, By Topological Quantum Chips (2023-2034) ($MN)
Table 17 Global Quantum Computing Semiconductor Market Outlook, By Photonic Quantum Chips (2023-2034) ($MN)
Table 18 Global Quantum Computing Semiconductor Market Outlook, By Ion Trap

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Quantum Chips (2023-2034) ($MN)
Table 19 Global Quantum Computing Semiconductor Market Outlook, By Silicon/Semiconductor Quantum Chips (2023-2034) ($MN)
Table 20 Global Quantum Computing Semiconductor Market Outlook, By Other Emerging Technologies (2023-2034) ($MN)
Table 21 Global Quantum Computing Semiconductor Market Outlook, By Material (2023-2034) ($MN)
Table 22 Global Quantum Computing Semiconductor Market Outlook, By Silicon (Si) (2023-2034) ($MN)
Table 23 Global Quantum Computing Semiconductor Market Outlook, By Germanium (Ge) (2023-2034) ($MN)
Table 24 Global Quantum Computing Semiconductor Market Outlook, By Superconducting Materials (2023-2034) ($MN)
Table 25 Global Quantum Computing Semiconductor Market Outlook, By Other Materials (2023-2034) ($MN)
Table 26 Global Quantum Computing Semiconductor Market Outlook, By Application (2023-2034) ($MN)
Table 27 Global Quantum Computing Semiconductor Market Outlook, By Below 30 Qubit Quantum Computers (2023-2034) ($MN)
Table 28 Global Quantum Computing Semiconductor Market Outlook, By 30–50 Qubit Quantum Computers (2023-2034) ($MN)
Table 29 Global Quantum Computing Semiconductor Market Outlook, By 50–60 Qubit Quantum Computers (2023-2034) ($MN)
Table 30 Global Quantum Computing Semiconductor Market Outlook, By Above 60 Qubit Quantum Computers (2023-2034) ($MN)
Table 31 Global Quantum Computing Semiconductor Market Outlook, By Quantum Simulators (2023-2034) ($MN)
Table 32 Global Quantum Computing Semiconductor Market Outlook, By End User (2023-2034) ($MN)
Table 33 Global Quantum Computing Semiconductor Market Outlook, By Banking, Financial Services, and Insurance (BFSI) (2023-2034) ($MN)
Table 34 Global Quantum Computing Semiconductor Market Outlook, By Healthcare and Pharmaceuticals (2023-2034) ($MN)
Table 35 Global Quantum Computing Semiconductor Market Outlook, By Government and Defense (2023-2034) ($MN)
Table 36 Global Quantum Computing Semiconductor Market Outlook, By Automotive and Aerospace (2023-2034) ($MN)
Table 37 Global Quantum Computing Semiconductor Market Outlook, By Chemicals and Energy (2023-2034) ($MN)

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Table 38 Global Quantum Computing Semiconductor Market Outlook, By IT and Telecommunications (2023-2034) ($MN)
Table 39 Global Quantum Computing Semiconductor Market Outlook, By Other End Users (2023-2034) ($MN)
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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