

Global IC Design Fault Detection ? Classification (FDC) Software Market 2026 by Company, Regions, Type and Application, Forecast to 2032

<https://marketpublishers.com/r/G09A5A31D4F1EN.html>

Date: August 2026

Pages: 83

Price: US\$ 3,480.00 (Single User License)

ID: G09A5A31D4F1EN

Abstracts

According to our (Global Info Research) latest study, the global IC Design Fault Detection ? Classification (FDC) Software market size was valued at US\$ 545 million in 2025 and is forecast to a readjusted size of US\$ 1090 million by 2032 with a CAGR of 10.3% during review period.

IC Design Fault Detection ? Classification (FDC) Software is a category of equipment engineering and process control industrial software for semiconductor manufacturing, assembly and test, and other high-precision manufacturing environments. Its core objective is to continuously collect equipment sensor data, process parameters, event logs, recipe context, and lot information during wafer, chip, package, or test production, and to cleanse, align, model, monitor, and alarm high-frequency data such as temperature, pressure, gas flow, RF power, vacuum status, motor status, chamber status, process time, and equipment events. By doing so, it provides early warning before equipment drift, process excursions, component degradation, recipe abnormalities, sensor anomalies, or batch-level yield losses occur. This type of software is typically delivered as an FDC module, equipment engineering system, advanced process control platform, CIM/MES extension module, or smart manufacturing analytics platform. Key technologies include real-time trace data acquisition, univariate and multivariate statistical modeling, SPC rules, dimensionality reduction methods such as PCA and PLS, machine learning anomaly detection, automatic feature extraction, fault model libraries, alarm prioritization, root cause localization, OCAP linkage, MES and EAP integration, and cross-fab data management. Typical customers include foundries, IDMs, memory manufacturers, power semiconductor manufacturers, compound semiconductor fabs, advanced packaging facilities, outsourced assembly and test providers, and semiconductor equipment makers. Primary users include equipment

engineers, process engineers, yield engineers, automation engineers, and manufacturing operations teams. Commercial delivery commonly includes software licenses, site subscriptions, modular deployment, project implementation, interface adaptation, model tuning, annual maintenance, and multi-fab replication. Its value is concentrated in reducing unplanned downtime, lowering scrap and rework, improving overall equipment effectiveness, shortening excursion response cycles, enhancing process stability, and supporting AI-driven yield improvement.

The industrial value of IC design Fault Detection ? Classification (FDC) Software is expanding from standalone anomaly alarming to a foundational control capability for semiconductor manufacturing quality, equipment efficiency, and yield security. As AI chips, advanced logic, memory, power semiconductors, compound semiconductors, and advanced packaging lines continue to expand, process tools generate rapidly growing volumes of temperature, pressure, flow, vacuum, RF power, chamber status, motion component, recipe context, lot information, and event log data during production. Traditional manual inspection and after-the-fact statistics are no longer sufficient to identify subtle drift in time. By collecting equipment trace data in real time and combining rule thresholds, statistical process control, multivariate modeling, machine learning anomaly detection, and fault classification mechanisms, this type of software can generate early warnings before equipment failure, process excursions, sensor miscalibration, component degradation, and batch-level yield losses expand. Its core value is not limited to detecting abnormalities, but lies in integrating equipment status, process stability, excursion response, maintenance planning, and yield improvement into a unified data closed loop, helping foundries, assembly and test facilities, and semiconductor equipment makers reduce unplanned downtime, lower scrap and rework, improve overall equipment effectiveness, and support more stable production ramp-up.

The competitive landscape of IC design Fault Detection ? Classification (FDC) Software will shift from standalone FDC functionality toward platform, intelligence, and system integration capabilities. Semiconductor manufacturing sites usually operate equipment from different brands, generations, and interface protocols, so software suppliers must not only collect data and build alarm models, but also support SECS/GEM, EDA Interface A, MES, EAP, SCADA, SPC, APC, YMS, and database systems, while connecting data from front-end manufacturing, assembly and test, metrology and inspection, equipment maintenance, and yield analysis. Suppliers with capabilities in real-time trace management, historical data traceability, low-false-alarm detection, root cause assistance, model version management, cross-tool migration, and multi-fab replication will be better positioned to enter the core manufacturing systems of large

fabs and assembly and test facilities. As AI and machine learning capabilities mature, FDC software will further converge with predictive maintenance, virtual metrology, run-to-run control, energy optimization, digital twins, and large-model-assisted root cause analysis, evolving from an equipment engineering tool into an important component of the semiconductor smart manufacturing data platform. Long-term supplier barriers will come from the combined accumulation of algorithmic capability, semiconductor process knowledge, field implementation experience, interface adaptation capability, and continuous operational support.

The market outlook for IC design Fault Detection ? Classification (FDC) Software is broadly positive, driven mainly by global wafer fab equipment investment growth, advanced packaging expansion, mature-node upgrades, localization substitution, and the transformation of manufacturing data into strategic assets. New fabs typically build CIM, MES, EAP, SPC, APC, and FDC manufacturing software systems in parallel, while legacy lines improve equipment transparency through equipment engineering system upgrades, SECS/GEM modernization, EDA Interface A access, and FDC module enhancement. The assembly and test segment, characterized by large equipment fleets, fast cycle times, and long chains of abnormality impact, will also become an important incremental scenario for equipment health monitoring software. Regionally, suppliers in the United States, Europe, Japan, and China each have accumulated capabilities in manufacturing analytics, equipment interfaces, industrial automation, and semiconductor CIM, while demand is mainly concentrated in semiconductor manufacturing bases such as mainland China, Taiwan, South Korea, Japan, the United States, Singapore, Malaysia, and Europe. Over the medium to long term, as AI chips and advanced packaging drive the construction of more complex production lines, FDC software is expected to shift from an optional efficiency improvement tool to a necessary system for ensuring production stability, yield security, and equipment asset utilization, with growth potential above that of traditional equipment management software.

Report Scope

This report is a detailed and comprehensive analysis for global IC Design Fault Detection ? Classification (FDC) Software market. Both quantitative and qualitative analyses are presented by company, by region & country, by Monitoring Object and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global IC Design Fault Detection ? Classification (FDC) Software market size and forecasts, in consumption value (\$ Million), 2021-2032

Global IC Design Fault Detection ? Classification (FDC) Software market size and forecasts by region and country, in consumption value (\$ Million), 2021-2032

Global IC Design Fault Detection ? Classification (FDC) Software market size and forecasts, by Monitoring Object and by Application, in consumption value (\$ Million), 2021-2032

Global IC Design Fault Detection ? Classification (FDC) Software market shares of main players, in revenue (\$ Million), 2021-2026

The Primary Objectives in This Report Are:

- To determine the size of the total market opportunity of global and key countries

- To assess the growth potential for IC Design Fault Detection ? Classification (FDC) Software

- To forecast future growth in each product and end-use market

- To assess competitive factors affecting the marketplace

This report profiles key players in the global IC Design Fault Detection ? Classification (FDC) Software market based on the following parameters - company overview, revenue, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include INFICON, PDF Solutions, Inc., Applied Materials, Inc., camLine GmbH, Yokogawa Electric Corporation, elInnoSys, Inc., Semitronix Corporation, GETECH, FA Software Co., Ltd., Synopsys, Inc., etc.

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

Market segmentation

IC Design Fault Detection ? Classification (FDC) Software market is split by Monitoring Object and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for Consumption Value by Monitoring Object and by Application. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Monitoring Object

Front-End Process Equipment Monitoring Software

Assembly and Test Equipment Monitoring Software

Facility Auxiliary Equipment Monitoring Software

Equipment Communication Interface Monitoring Software

Cross-Line Equipment Fleet Monitoring Software

Equipment Engineering Data Platform Software

Other

Market segment by Analysis Method

Rule and Threshold Monitoring Software

Univariate Statistical Monitoring Software

Multivariate Statistical Modeling Software

Machine Learning Anomaly Detection Software

Deep Learning Fault Classification Software

Hybrid Physics and Data Modeling Software

Adaptive Online Learning Software

Other

Market segment by Integration Interface

SECS/GEM Interface Software

EDA Interface A Interface Software

MES Integration Software

EAP Integration Software

SCADA Integration Software

APC Integration Software

SPC Integration Software

YMS Integration Software

Database Integration Software

Market segment by Application

Equipment Fault Early Warning

Process Drift Identification

Abnormal Lot Interception

Equipment Maintenance Optimization

Root Cause Analysis Assistance

Yield Loss Prevention

Other

Market segment by players, this report covers

INFICON

PDF Solutions, Inc.

Applied Materials, Inc.

camLine GmbH

Yokogawa Electric Corporation

eInnoSys, Inc.

Semitronix Corporation

GETECH

FA Software Co., Ltd.

Synopsys, Inc.

Market segment by regions, regional analysis covers

North America (United States, Canada and Mexico)

Europe (Germany, France, UK, Russia, Italy and Rest of Europe)

Asia-Pacific (China, Japan, South Korea, India, Southeast Asia and Rest of Asia-Pacific)

South America (Brazil, Rest of South America)

Middle East & Africa (Turkey, Saudi Arabia, UAE, Rest of Middle East & Africa)

Chapter Outline

Chapter 1, to describe IC Design Fault Detection ? Classification (FDC) Software product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top players of IC Design Fault Detection ? Classification (FDC) Software, with revenue, gross margin, and global market share of IC Design Fault Detection ? Classification (FDC) Software from 2021 to 2026.

Chapter 3, the IC Design Fault Detection ? Classification (FDC) Software competitive situation, revenue, and global market share of top players are analyzed emphatically by landscape contrast.

Chapter 4 and 5, to segment the market size by Monitoring Object and by Application, with consumption value and growth rate by Monitoring Object, by Application, from 2021 to 2032.

Chapter 6, 7, 8, 9, and 10, to break the market size data at the country level, with revenue and market share for key countries in the world, from 2021 to 2026. and IC Design Fault Detection ? Classification (FDC) Software market forecast, by regions, by Monitoring Object and by Application, with consumption value, from 2027 to 2032.

Chapter 11, market dynamics, drivers, restraints, trends, Porters Five Forces analysis.

Chapter 12, the key raw materials and key suppliers, and industry chain of IC Design Fault Detection ? Classification (FDC) Software.

Chapter 13, to describe IC Design Fault Detection ? Classification (FDC) Software research findings and conclusion.

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