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Global Discrete Semiconductor Device for Solid State Relays Market Growth 2026-2032

https://marketpublishers.com/r/GB27C38B5A3BEN.html
Date: February 2026
Pages: 90
Price: US$ 3,660.00 (Single User License)
ID: GB27C38B5A3BEN

Abstracts

The global Discrete Semiconductor Device for Solid State Relays market size is predicted to grow from US$ 250 million in 2025 to US$ 369 million in 2032; it is expected to grow at a CAGR of 5.8% from 2026 to 2032.

In 2024, the global production of power semiconductor devices for solid-state relays reached 936 million units, with an average ex-factory price of USD 0.26 per unit. A Discrete Semiconductor Device for Solid State Relays (SSRs) refers to the individual semiconductor components that are used to construct solid state relays. These devices are essential in the functioning of SSRs, which are electronic switching devices used to control electrical loads without the mechanical contacts found in traditional electromechanical relays.

The industry of power semiconductor devices used in solid-state relays (SSRs) is in a critical phase of transformation, migrating from traditional electromechanical switching to high-performance electronic switching equipment. In SSRs, power devices serve as the core switching element—where structural type, drive mode, material and packaging performance directly dictate the SSR's output ratings, thermal losses, switching speed and reliability. With the acceleration of industrial automation, renewable energy, electric transportation and smart grid applications, demand for SSRs with high current carrying capability, elevated voltage tolerance, rapid switching response and wide operating temperature range is rapidly rising.

From a product-structure perspective, power devices serving SSRs may be categorised by drive mode (voltage-driven devices such as MOSFETs and IGBTs vs current-driven devices such as SCR/thyristors); by power-rating tiers (low-power, medium-power, high-power, ultra-high-power); by packaging format (discrete single-chip, power module,

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heatsink-integrated packaging); and by material technology (traditional silicon (Si) devices vs wide-bandgap devices such as SiC or GaN). Each of these classification dimensions drives SSR modules toward higher performance, smaller form-factor and reduced losses.

In terms of cost structure, power devices occupy a very high share of the SSR total manufacturing cost and thus are a key determinant of profitability for module and relay makers. A representative cost breakdown is: power switching devices themselves ~45 %-55 %; other electronic components (drivers, isolation circuitry) ~18 %-22 %; structural components (plastic parts, enclosures, mounting elements) ~7 %-10 %; heat-sink and packaging infrastructure ~6 %-8 %; manufacturing overhead (labour, assembly, testing & certification) ~15 %-20 %. A highly automated production line can achieve annual output in the order of millions to tens of millions of units. At the industry level, gross margins typically range between 40 %-60 %, with leading products often above 60 %.

In the supply-chain panorama, upstream comprises wafer foundries, semiconductor material suppliers and power device design houses; mid-stream includes power-device packaging & testing houses, module integrators and SSR manufacturers; downstream covers SSR module/system suppliers, industrial automation equipment makers and renewable-energy system integrators. The industry exhibits a “research & materials concentrated at the upstream, manufacturing dispersed in the mid-stream, broad application in the downstream” characteristic. In the competitive landscape, firms that master power-device design, packaging, thermal management and drive-circuit integration gain decisive edge over those competing only on commodity power segments.

Looking forward, the evolution path for power devices in SSR applications is clear: devices will support higher current, higher voltage ratings (e.g. >100 A, >1000 V), faster switching frequencies, wider temperature ranges and more compact and efficient packaging, while also integrating digital drive and status-monitoring functions for smart operation. Wide-bandgap materials such as SiC and GaN are becoming the preferred choice in high-end SSR applications, and modular, platform-based design trends are gaining traction. In manufacturing, companies will compete by increasing single-line throughput, lowering device cost, optimizing thermal management and drive solutions into the next performance frontier.

LP Information, Inc. (LPI) ' newest research report, the “Discrete Semiconductor Device for Solid State Relays Industry Forecast” looks at past sales and reviews total world Discrete Semiconductor Device for Solid State Relays sales in 2025, providing a

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comprehensive analysis by region and market sector of projected Discrete Semiconductor Device for Solid State Relays sales for 2026 through 2032. With Discrete Semiconductor Device for Solid State Relays sales broken down by region, market sector and sub-sector, this report provides a detailed analysis in US$ millions of the world Discrete Semiconductor Device for Solid State Relays industry.

This Insight Report provides a comprehensive analysis of the global Discrete Semiconductor Device for Solid State Relays 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 Discrete Semiconductor Device for Solid State Relays portfolios and capabilities, market entry strategies, market positions, and geographic footprints, to better understand these firms' unique position in an accelerating global Discrete Semiconductor Device for Solid State Relays market.

This Insight Report evaluates the key market trends, drivers, and affecting factors shaping the global outlook for Discrete Semiconductor Device for Solid State Relays and breaks down the forecast by Type, 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 Discrete Semiconductor Device for Solid State Relays.

This report presents a comprehensive overview, market shares, and growth opportunities of Discrete Semiconductor Device for Solid State Relays market by product type, application, key manufacturers and key regions and countries.

Segmentation by Type:

MOSFET

IGBT

Bipolar Power Transistors

Thyristors

Segmentation by Materials:

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Silicon-based Devices

Non-silicon-based Devices

Segmentation by Control Method:

Current-driven Devices

Voltage-driven Devices

Segmentation by Application:

PCB Mount Solid State Relay

Panel Mount Solid State Relay

Din Rail Mount Solid State Relay

This report also splits the market by region:

Americas

United States

Canada

Mexico

Brazil

APAC

China

Japan

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- 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.

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STMicroelectronics

Toshiba

Vishay

Fuji Electric

Renesas Electronics

Rohm

Nexperia

Mitsubishi Electric

Key Questions Addressed in this Report

What is the 10-year outlook for the global Discrete Semiconductor Device for Solid State Relays market?

What factors are driving Discrete Semiconductor Device for Solid State Relays market growth, globally and by region?

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

How do Discrete Semiconductor Device for Solid State Relays market opportunities vary by end market size?

How does Discrete Semiconductor Device for Solid State Relays break out by Type, by Application?

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