Domestic Production of Relay Protection Chips

Overview

With the open access of a large number of distributed generation, DC transmission and electric vehicles, a new deep low-carbon power system dominated by power electronic devices has gradually been...

Key Takeaways

Domestic production of relay protection chips is advancing through system-on-chip (SoC) integration, automated manufacturing, and smart grid-oriented designs, improving speed, reliability, and local supply capabilities.

Technological Development

Relay protection chips are increasingly being developed as system-on-chip (SoC) solutions, integrating hardware and software to enhance the performance of protective relays in power grids.

These So

Cs enable high-speed data acquisition, local equipment operation, and integration of primary and secondary devices, which significantly shortens protection action times and improves reliability and stability of relay protection devices (Li et al., 2023). Modern SoC-based relay protection chips also support hardware algorithm acceleration and collaborative computing between software and hardware, which is critical for power-electronics-dominated grids.

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Production and Automation

Domestic production of relay protection devices, including chips, is moving toward automation and smart manufacturing. Production lines based on Cyber-Physical Systems (CPS) allow automated assembly, testing, and logistics, replacing manual labor with programmable logic controllers (PLCs), automated guided vehicles (AGVs), and RFID tracking for real-time monitoring (Zhou et al., 2023). This approach improves production efficiency, quality control, and transparency, enabling higher output and faster deployment of relay protection chips for domestic power grids.

Reliability and Lifecycle ManagementMicroprocessor-based relay chips produced domestically are designed for long service life, often exceeding two decades. Manufacturers focus on high-quality materials, robust design, and rigorous testing to ensure reliability. Field data indicate that even after 20–25 years, relays can remain functional with proper maintenance, and domestic production emphasizes repairability and lifecycle management to maintain grid safety and reduce replacement costs (SEL Inc., 2023).

Challenges and Future Directions

Despite progress, domestic relay protection chip production faces challenges such as: Adapting to power-electronics-dominated grids, which require faster and more intelligent protection strategies (IEC, 2023). Ensuring standardization and verification for AI-based protection and SoC integration. Balancing local supply chain capabilities with global technological trends.

Future development is expected to focus on enhanced integration, AI-assisted protection, and higher automation in production, supporting the domestic smart grid and renewable energy integration.

Summary

Domestic production of relay protection chips is rapidly evolving, combining SoC technology, automated manufacturing, and long-term reliability strategies. These advancements strengthen local capabilities, reduce dependence on imports, and support the modernization of power grids with faster, more reliable, and intelligent protection systems.

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Article Content

Reliability Research Strategy of All-domesticized Chip Relay Protection ...

In the current international situation, based on the existing domestic chips, the rapid development of relay protection backup device can be used for emergency spare parts of relay protection devices in

Research on the Development and Testing Technology of Domestic

The development of high-performance, high-reliability domestic chips and the localization of core components for relay protection have become the development strategy of the State Grid

Research of the system-on-chip-based relay protection technology

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Development of Relay Protection Device Production on Line Control ...

This paper designs an automatic production line control system which is based on model of Cyber-Physical Systems (CPS), and meets the requirements of production process parameters,

Industrial Control Chips Domestic Substitution | Weyland

Domestic substitution of industrial control chips refers to the gradual adoption of domestically produced chips in the field of industrial control to replace the original reliance on

Research of the system-on-chip-based relay protection ...

There are three reasons why microcomputer relay protection develops so rapidly. First, the technical progress is promoted by the huge market demand brought by the expansion of power

The Pillars Necessary for a Strong Domestic Semiconductor Industry

U.S. leadership in semiconductor design and production is of strategic importance and is essential for competitiveness; however, the domestic semiconductor industry currently confronts a

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Research and Detection Technology of Gigabit Network Controller

It is necessary to conduct research on key technologies of industrial grade gigabit network controller chips to reduce the impact of chip supply interruption and ensure the safe and stable operation of the

Research on the Development and Testing Technology of Domestic Chip ...

As the core equipment of the power grid, the relay protection device''s self-control plays a key role in the safe and stable operation of the power grid. The development of high-performance, high-reliability

Research of the system-on-chip-based relay protection technology

fi grid in the future. This paper presents a chip-based relay protection technology based on system-on-chip (SoC), which is described from four aspects, namely, the architectural design of the relay

Research on Accelerated Life Testing and Reliability Prediction ...

The domestically produced chip-based relay protection device has achieved a breakthrough from zero to one, but its reliability has not yet been tested in long-term operating environments. It is urgent to

Chinese companies continue to increase investment in domestic chip ...

Chinese companies are lining up to invest in semiconductor sector amid Beijing''s efforts to spur greater self-sufficiency amid US tech rivalry.

Research on the influence and test of core components on relay ...

he power system. Therefore, it is necessary to analyze the impact of relay protection core components on the entire relay protection system, so as to ensure that the replacement of domestic chips ...

US Tariff Impact on Protective Relay Industry

Newly announced US tariffs create both challenges and opportunities for stakeholders across the protective relay industry value chain. Domestic manufacturers benefit temporarily from

With Money, and Waste, China Fights for Chip Independence

Local manufacturers of logic chips, which perform computations, are expanding production, largely for Chinese customers. Those manufacturers might not have much choice but to

US Tariff Impact on Relay Industry

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Adapting to Tariff-Induced Market Shifts Tariffs present both challenges and opportunities across the relay market. Domestic manufacturers could benefit from reduced competition but must

Research on the development and detection technology of CAN

Core chips of the secondary equipment in the power grid are very important to the stable operation of relay protection devices. It is necessary to conduct research on key technologies of industrial grade

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