Intelligent Micro-Modular Chip

AI Overview

An Intelligent Micro-Modular Chip is a compact, integrated module that combines power or data management with embedded intelligence for predictive control, high efficiency, and scalable deployment.OverviewIntelligent micro-modular chips are designed to integrate multiple functions—such as power switching, control, and monitoring—into a single compact module. In power electronics, these modules, often called Intelligent Power Modules (IPMs), combine high-performance MOSFETs, IGBTs, or SiC devices with gate driver ICs, enabling precise switching, reduced losses, and high power density for applications ranging from a few watts to several kilowatts . In data center applications, intelligent micro-modules integrate sensors, controllers, and analytics to monitor critical components like batteries, capacitors, and cooling systems, enabling predictive maintenance and energy optimization .Key FeaturesHigh Integration: Combines multiple components (power devices, drivers, sensors) into a single module, reducing footprint and simplifying system design .Intelligence: Embedded controllers and analytics allow real-time monitoring, failure prediction, and proactive maintenance .Scalability: Modules can be deployed in parallel or stacked configurations, supporting flexible expansion in data centers or power systems .Efficiency: Optimized switching and thermal management reduce energy losses and improve overall system performance .Reliability: Continuous monitoring of key parameters ensures early detection of anomalies, minimizing downtime .ApplicationsData Centers: Intelligent micro-modular solutions enable rapid deployment of modular data centers, energy-efficient operations, and predictive maintenance for critical infrastructure .Industrial and Automotive Power Systems: IPMs are used in motor drives, inverters, DC-DC converters, and electric vehicle powertrains, providing compact, high-efficiency, and reliable power management .Telecom and AI Infrastructure: Supports high-density AI model deployment with fle...

Article Content

Huawei''s Intelligent Micro-Module Tops China''s Micro-Module Data

Huawei has unveiled an innovative intelligent micro-module solution designed to aid enterprises in swiftly deploying large-scale AI models.

A flexible digital compute-in-memory chip for edge intelligence

Here we propose FLEXI, a family of flexible chips leading to edge-accelerating intelligence. FLEXI is fabricated using a commercial low-temperature polycrystalline silicon (LTPS)

An intelligent digital microfluidic system with fuzzy-enhanced feedback ...

We describe a modular digital microfluidic system with fuzzy-enhanced feedback. It features electronic-control software-defined intelligence to address the intricacy of

First university-designed 7-nanometer AI chip

The European Union''s first AI chip using 7-nanometre technology comes from Bavaria and combines performance, energy efficiency and security.

Design and Practice of a Modular Intelligent Digital Service ...

Aiming at key pain points in traditional intelligent digital service development—poor hardware adaptability, disconnected virtual-real interaction, and inefficient AI deployment on edge

Reconfigurable heterogeneous integration using stackable chips with ...

By using optoelectronic device arrays for chip-to-chip communication and neuromorphic cores based on memristor crossbar arrays for highly parallel data processing, reconfigurable and

Intelligent Power Module (IPM) Devices

ST''s power modules help you simplify designs and reduce component count. Save costs with ST''s intelligent power modules (IPMs) for flexible and robust designs,

Empowering Innovation | Microchip Technology

Microchip Technology is a leading provider of microcontroller, mixed-signal, analog and Flash-IP solutions that also offers outstanding technical support.

Chiplets: piecing together the next generation of chips

Chiplets are small, modular chips serving a specific function, such as CPUs or GPUs that can be mixed and matched into a complete system. The

3D Modular Microrobots: Micro-Origami Cubes with Integrated Si Chips ...

Abstract page for arXiv paper 2412.02224: 3D Modular Microrobots: Micro-Origami Cubes with Integrated Si Chips Dive, Communicate, Flash Programs, and Form Collectives

Si chiplet–controlled 3D modular microrobots with smart

As a modular, mass-producible platform (instead of modular, mass producible entity), smartlets are compatible with automated flip-chip bonding of

Chiplets: The Future of Modular Semiconductor Design

In an era defined by the insatiable demand for artificial intelligence, the semiconductor industry is undergoing a profound transformation. At the heart of this revolution lies chiplet

New i3 Micro Module | TDK Electronics

TDK Corporation (TSE:6762) today announced the TDK i3 Micro Module, the world''s first module with built-in edge AI and wireless mesh

Rapid Customization of 3D Integrated Microfluidic Chips via Modular ...

In this paper, we present a novel method that utilizes modular structure-based design, which could greatly reduce the time and cost for customization of complete integrated chips,

Space Station Research Explorer on NASA.gov

At any given time on board the space station, a large array of different experiments are underway within a wide range of disciplines. Here, you can search the

Modular Microfluidics: Current Status and Future

In this review, we discuss the current forms, applications, limitations, and future perspectives of modular microfluidic techniques. So-called modular

3D Modular Microrobots: Micro-Origami Cubes with Integrated Si Chips ...

Modular microrobotics can potentially address many information-intensive microtasks in medicine, manufacturing and the environment. However, surface area has limited the natural

Chiplets: piecing together the next generation of chips

Separating functions and technology nodes into different chiplets proves more cost-effective and has space and performance benefits over huge

Abstract

Abstract Modular microrobotics can potentially address many information-intensive microtasks in medicine, manufacturing and the environment. However, surface area has limited the natural

Multi-chip modules or modular design chiplets for

Multi-chip modules or ''chiplets'' involve scalable architecture and modular design to create process nodes that can be optimised for subsystems rather than using

TU Chemnitz: Modular microrobots that can communicate and cooperate

August 20, 2025. In a decisive step towards intelligent microrobot systems, a team from the Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN) at Chemnitz

Power Modules

Our portfolio offers scalable and innovative power module solutions to optimize energy management, simplify system design and accelerate product

Chiplet Technology: Revolutionizing Semiconductor

As a heterogeneous integration technology, the chiplet-based design technology integrates multiple heterogeneous dies of diverse functional circuit

Si chiplet-controlled 3D modular microrobots with smart

Modular microrobotics can potentially address many information-intensive microtasks in medicine, manufacturing, and the environment. However, surface area has limited the natural

Research team demonstrates modular, scalable

Researchers developed a modular fabrication process to produce a quantum system-on-chip which integrates an array of artificial atom qubits onto a

Intelligent power modules (IPM) | Infineon Technologies

We provide a comprehensive portfolio of Intelligent Power Modules (IPMs) covering a wide range of semiconductor technologies, package types, and voltage/current

Smart flexible microfluidic technology: Intelligent sensors, chips ...

Starting from intelligent sensors manufacturing, this paper elaborates on the types of microfluidic chips, detection mechanisms, and multimodal AI decision-making. The materials,

Intelligent microscopic imaging system based on microwell array chip ...

Herein, an intelligent microscopic imaging system based on microarray chips is reported to achieve high-throughput analysis of single cells. The system integrates a special microwell array

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