



Optimizing Semiconductor Manufacturing: Comprehensive Infrastructure Solutions from Fabrication to Data Centers



A leading global semiconductor manufacturer faced critical challenges in optimizing their entire production process, from sub-fabrication (sub-fab) areas and central utility buildings (CUBs) to cleanrooms and onsite data centers. The company sought to maintain its competitive edge by enhancing operational efficiency, ensuring uptime, and reducing energy consumption across multiple facets of its manufacturing and support operations.

Key Technical and Operational Challenges in Infrastructure Deployment

The company encountered several infrastructure challenges while developing its semiconductor subfab sites:

1. Sub-Fab Area Optimization:

Maintaining precision and cleanliness in the sub-fab area is vital. As the demand for semiconductors rose, the company needed to expand its capacity while managing stringent cleanliness standards and preventing contamination during production.

2. Central Utility Building (CUB) Efficiency:

The CUB is the backbone of any semiconductor plant, managing utilities such as electricity, water, and cooling systems. The company required advanced infrastructure solutions to ensure efficient, continuous power distribution and environmental controls throughout the facility.

3. Data Center Performance:

With the rise of smart manufacturing and edge computing, the semiconductor manufacturer needed robust, scalable data center infrastructure to support real-time data processing, enhance decision-making, and reduce latency. The challenge was to integrate these solutions within their existing sites while maintaining performance and reliability.

4. Cleanroom Compliance and Thermal Management:

The cleanroom environment required stringent cleanliness standards, thermal management solutions, and space optimization to house high-density equipment without risking contamination or overheating.

Customized Infrastructure Solutions for Sub-Fab, CUBs, Cleanrooms, and Data Centers

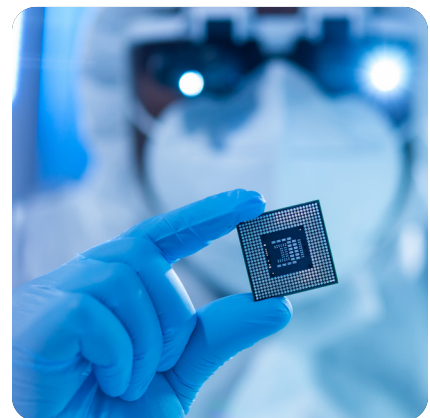
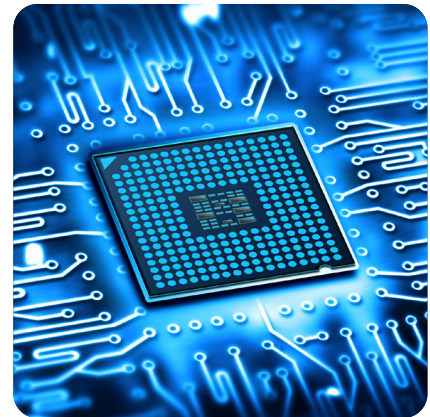
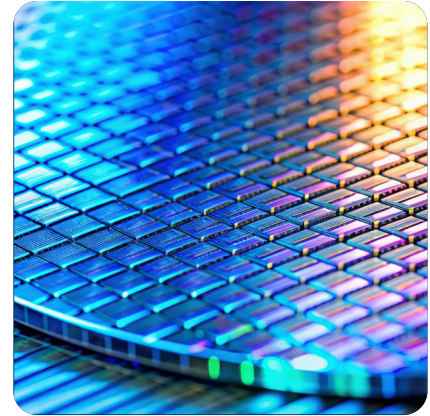
To address these challenges, the semiconductor manufacturer partnered with Chatsworth Products (CPI) to deploy a comprehensive suite of ICT infrastructure solutions designed for the entire scope of its operations, from the sub-fab areas and CUBs to the data centers and cleanrooms.

• CUB Solutions:

CPI implemented customized racks, cable management, and power distribution systems that seamlessly integrated with the company's sub-fab operations. These solutions ensured clean, efficient, and reliable utility management across the facility, improving the uptime and performance of the company's utilities and equipment.

• Data Center Optimization:

CPI deployed data center technology and edge computing infrastructure to support the company's increasing reliance on real-time data processing. The implementation of edge enclosures near production lines ensured faster data processing and greater operational efficiency.



- **Comprehensive Sub-Fab Solution:**

CPI deployed a customized 4-cabinet solution tailored specifically for the sub-fab area, incorporating high-density wire management and an advanced power distribution framework.

- **Cleanroom Specification and Thermal Management:**

CPI's racks and enclosures are designed to meet the cleanliness requirements of data center environments, providing protection against contamination. Advanced thermal management solutions, including passive and active cooling systems, regulated temperature effectively, enabling the high-density equipment to perform optimally without overheating. With CPI's ability to produce non-painted racks and cable managers, the potential for outgassing from painted materials is significantly reduced, ensuring a cleaner and safer environment for sensitive cleanroom operations.

Measurable Impact: Enhanced Operational Efficiency and Sustainability

The collaboration with CPI had a significant impact across all aspects of the semiconductor manufacturer's operations:

- **Increased Uptime and Efficiency:**

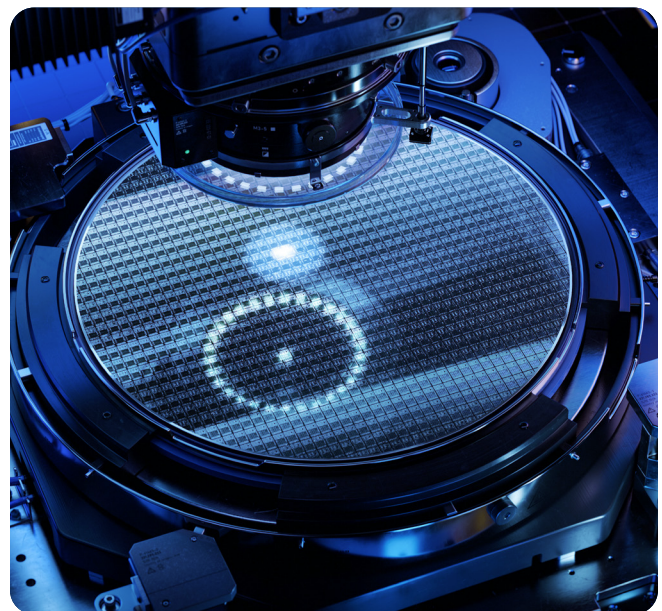
CPI's solutions led to improved operational efficiency, with uptime across sub-fab, cleanroom, and data center operations reaching 98%. This ensured the company consistently met production targets without interruptions, enhancing its ability to innovate and scale its operations.

- **Energy Savings and Sustainability:**

The passive cooling solutions provided by CPI played a critical role in managing the thermal loads generated by equipment within the cleanroom. These solutions reduced the average operating temperature by 25%, enhancing the performance and lifespan of the equipment and lowered operational cost.

- **Improved Performance and Reliability:**

CPI's infrastructure solutions, designed specifically for the demanding environments of semiconductor manufacturing, enabled the company to achieve its goal of enhanced reliability, reduced defects, and lower thermal loads, leading to higher yields and a longer lifespan for equipment.





Through its partnership with Chatsworth Products, the semiconductor manufacturer successfully optimized its sub-fab area, CUB, data center, and cleanroom operations, demonstrating the value of customized infrastructure solutions in maintaining leadership in the competitive semiconductor industry.

About Chatsworth Products

At Chatsworth Products (CPI), it is our mission to address today's critical IT infrastructure needs with products and services that protect your ever-growing investment in information and communication technology. We act as your business partner and are uniquely prepared to respond to your specific requirements with global availability and rapid product customization that will give you a competitive advantage. At CPI, our passion works for you. With over two decades of engineering innovative IT physical layer solutions for the Fortune 500 and multinational corporations, CPI can respond to your business requirements with unequalled application expertise, customer service and technical support, as well as a global network of industry-leading distributors. Headquartered in the United States, CPI operates from multiple sites worldwide, including offices in Mexico, Canada, China, the United Arab Emirates and the United Kingdom. CPI's manufacturing facilities are located in the United States, Asia and Europe.

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