LICENSING OPPORTUNITY: ADVANCED WAFER BONDING FOR HIGH-DENSITY SEMICONDUCTOR INTEGRATION

DESCRIPTION

Problem

The invention solves the challenge of connecting different kinds of electronic materials that don't easily stick together. In the past, it was difficult to combine various components, such as logic processors and memory, on a single piece of silicon. After the first bond, the surface becomes uneven, making it hard to add more layers.

Invention

This invention is a new method for bonding different types of computer wafers called "heterogeneous integration," which allows multiple materials and components to be combined into a single, more advanced electronic device. This invention creates matching pockets in new wafers to fit over existing ridges. It also uses special stop layers to prevent damage during etching. The result is a way to bond multiple layers without ruining the surface or previous components. This new method makes it possible to create more powerful and compact devices by seamlessly connecting these different parts.

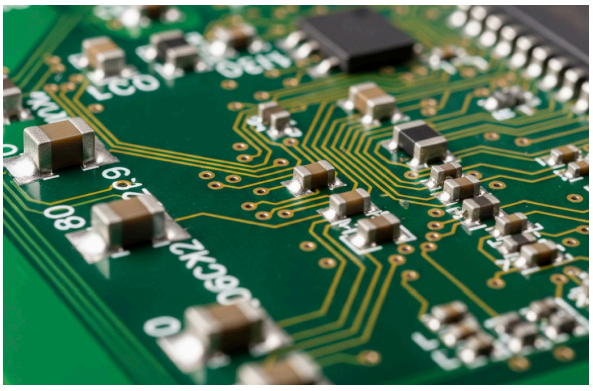
BENEFITS

Potential Commercial Applications

This technology can be used to build advanced chips for lasers, sensors, and quantum devices. It's ideal for photonics, where that light is used to send signals instead of electricity. It can help create compact, powerful chips for atomic clocks and quantum communication. It's also useful for integrating different materials into one chip, like combining silicon with gallium arsenide. Industries needing high-performance, multi-functional chips will benefit greatly.

Competitive Advantage

This invention reduces manufacturing costs by enabling multiple wafer layers to be bonded in a single, streamlined process. It minimizes material waste and improves yield by preventing damage during bonding and etching. The method supports integration of diverse materials, allowing companies to build more complex, high-value chips without expensive redesigns. Faster production and higher chip density translate to better performance at lower cost. Overall, it offers a scalable path to advanced semiconductor devices with a strong return on investment.



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