

Literary Review

## **An In-Depth Look Into The *Semiconductor Industry And The Fabrication Of Semiconductors***

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**Key Words:** Engineering, Semiconductors, Fabrication

### **Abstract**

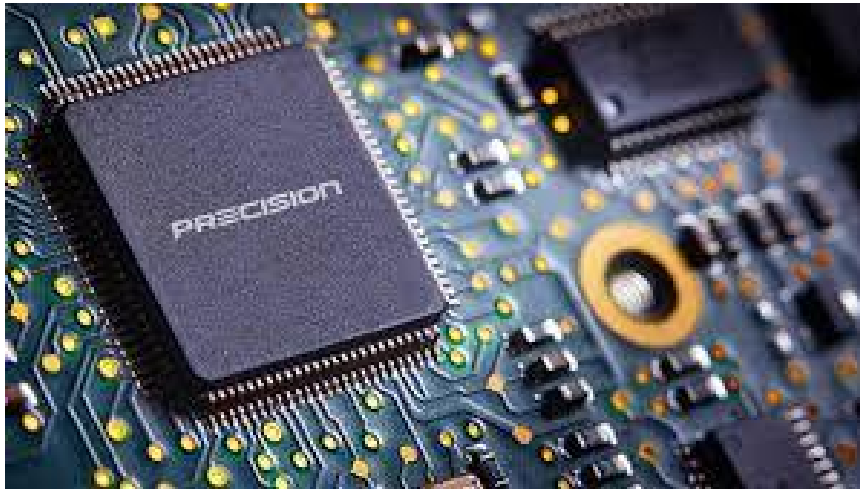
The Semiconductors industry is extremely overlooked in our modern world today. As a result many individuals lack the knowledge of what semiconductors are and what the industry consists of. Little do they know that the semiconductors industry is a key part of our daily life. Without the establishment and production of this industry essentials such as phones, computers, or any other electronic device would not be. Thus, in this literary review we will take an in depth look into the Semiconductor Industry and the fabrication of Semiconductors in order to understand what this industry is, what it consists of and why it is important and beneficial to our modern day world today and global economic growth.

### **Introduction:**

#### ***What Are Semiconductors?***

Semiconductors, also known as integrated circuits (ICs) or microchips are composed from pure elements, primarily silicon or compounds like gallium arsenide. In the doping portion of the creation process, small amounts of impurities are added to the pure elements, creating significant changes in the conductivity of the material. In simpler terms, a semiconductor is a substance that has specific electrical properties that grants it the ability to serve as a foundation for computers and other electronic devices (Zola, 2021). The installment of semiconductors is

essential in all electronic devices as they are useless without it. A single semiconductor chip has various transistors. Today there are more than 100 billion microchips; that is semiconductors, in daily use around the world. Due to their astounding significance in the usefulness of all electronic devices it is vital to make sure we know why they are useful and what they do.



## **Discussion:**

### ***Origin Of The Semiconductors Industry***

The origin of semiconductors can be traced back to the creation of the rectifier ( AC-DC converter) in 1874. A few decades later, Bardeen and Brattain Bell Laboratories in the US created the point-contact transistor in 1947. (4. *History of Semiconductors : Hitachi High-Tech Corporation*, n.d.) The transistor is a semiconductor device possessing an amplification function. In 1956, the Nobel Peace Prize in Physics was granted jointly to Bardeen and Brattain for their contribution to semiconductors research and the development of the transistor. As a result of the invention of the transistor, the Semiconductor industry increased rapidly.

## ***Fabrication Of Semiconductors***

The fabrication process of semiconductors is a unique process that many don't know about. Semiconductor fabrication is the process of manufacturing integrated circuits, or microchips, that form the core of modern electronic devices. This highly specialized process takes place in dedicated semiconductor fabrication facilities, known as fabs, that utilize cleanrooms to maintain an extremely precise and contamination-free environment. The fabrication process involves a series of complex steps, including wafer preparation, lithography, doping, thin-film deposition, etching, and packaging. Advanced semiconductor fabs today can produce microchips with feature sizes down to just a few nanometers, packing billions of microscopic transistors onto a single chip. The continual scaling down of semiconductor dimensions has been a key driver of Moore's Law, enabling exponential improvements in computing power, energy efficiency, and cost per function over successive generations of integrated circuits. Semiconductor fabrication is a capital-intensive industry that requires substantial investment in state-of-the-art equipment and facilities to maintain a competitive edge.

## ***Semiconductors In Everyday Life***

Just for clarification, semiconductors themselves are not sold in stores as electrical appliances. It may be hard to understand, but semiconductors are in fact used in many electric appliances. Like, temperature sensors used in air conditioners are in fact made with semiconductors. Another example is Rice Cookers. Such a device cooks rice to perfection due to the fact that semiconductors precisely control the temperature of the rice cookers to cook it to perfection. CPU's that operate personal computers also use semiconductors (*4. History of Semiconductors : Hitachi High-Tech Corporation, n.d.*). Various digital consumer products use semiconductors to operate. Some of which include, smartphones, digital cameras, televisions LED light bulbs, washing machines and refrigerators. All of these use semiconductors to efficiently operate.

## ***Conclusion***

All in All, without the existence of semiconductors everyday electric devices will not be available for us to use. It is extremely vital to know the importance of such a product as the fabrication of semiconductors is the core of the engineering industry and significant to the growth of the world's economic growth and sustainability.

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