Semiconductor Testing: An Intuitive Approach

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by Edward Marston

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Semiconductors are the building blocks of modern electronics. They are used in everything from computers and smartphones to cars and medical devices. To ensure that semiconductors meet the required specifications and are free of defects, they must be thoroughly tested.

Semiconductor testing is a complex and challenging process. It requires specialized equipment and expertise. In this article, we will take an intuitive approach to understanding semiconductor testing. We will cover the different types of semiconductor tests, the test equipment used, and the test standards that are followed.

Types of Semiconductor Tests

There are many different types of semiconductor tests that can be performed. The most common types include:

* **Wafer testing**: Wafer testing is performed on the semiconductor wafer before it is diced into individual chips. This type of testing can identify defects in the wafer that could lead to yield loss. * **Die testing**: Die testing is performed on individual chips after they have been diced from the wafer. This type of testing can identify defects in the die that could cause the chip to fail. * **Package testing**: Package testing is performed on the completed semiconductor package. This type of testing can identify defects in the package that could cause the chip to fail.

Semiconductor Test Equipment

The semiconductor test equipment used to perform these tests is highly specialized. It is designed to test the electrical, thermal, and mechanical properties of semiconductors. The most common types of semiconductor test equipment include:

* **Probers**: Probers are used to make electrical contact with the semiconductor device under test. * **Testers**: Testers are used to apply test signals to the device under test and measure the device's response. * **Handlers**: Handlers are used to move the device under test between the probers and testers.

Semiconductor Test Standards

There are a number of different semiconductor test standards that are followed by the industry. These standards ensure that the tests are performed in a consistent and reliable manner. The most common semiconductor test standards include:

* **ASTM F1617**: This standard covers the testing of integrated circuits. * **MIL-STD-883**: This standard covers the testing of semiconductors for

military applications. * **JESD22-A115**: This standard covers the testing of automotive semiconductors.

Semiconductor testing is a critical step in the manufacturing process of semiconductors. It ensures that the chips meet the required specifications and are free of defects. In this article, we have taken an intuitive approach to understanding semiconductor testing. We have covered the different types of semiconductor tests, the test equipment used, and the test standards that are followed.

By understanding the basics of semiconductor testing, you can better appreciate the challenges and complexities involved in this critical process.

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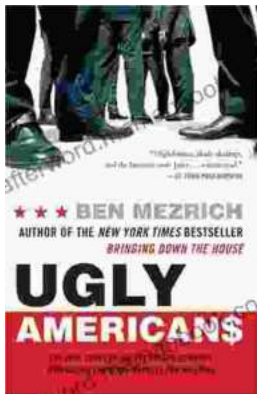
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