

High-Efficient Auto Batch EFA

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ABSTRACT:

In the Semiconductor world, the EFR (Early Failure Rate) test is recognized as the most effective qualification to demonstrate the DPPM (Defect Parts Per Million) level of Devices. The EFR test typically occurs on 10,000 to 100,000 dice, generating hundreds of defective devices that require EFA (Electrical Failure Analysis) to identify the failure modes. In the prior art, because failure modes and address various among defective Devices so EFA was done individually and manually for each failure through bench tester. This manual work results in an unfeasible amount of engineering effort for identifying the failure mode of the failed devices. For example, there could be 200 failures that occur during 20K dice EFR qualification. Due to resource limitations, we could only sample 10% (20) of failures for EFA with 2 engineers over 2 weeks. Since only a small portion of failures were covered, some failure modes may not be detected, which motivated us to develop a method to do batch EFA to cover 100% of failures within a given time without considering failure quantity. Fortunately, the High-Efficient Auto batch EFA can finish all failures within several hours with a standard FA report auto-generated, which is 100 times faster than manual work previously. The advantage of this invention lies in the testing and analysis of the failed samples, which provides critical feedback to the FAB process and mask Factory test coverage improvement.