



Outlier Detection

The Optimal+ Outlier Detection solution is designed to address fab process-related issues in order to meet aggressive outgoing quality targets. It works with Global Ops to statistically analyze offline test data from multiple operations, utilizing proven PAT (Part Average Testing) algorithms to identify good outlier units.

These algorithms are executed offline on test data using a pre-defined population (wafer or a lot), and can be integrated and combined within a single rule “recipe” during multiple operations. Outlier units can be automatically switched to different bins when the rule is applied in production.

- *A complementary solution to the Optimal+ Semiconductor Operations Platform*
- *Requires Global Ops*

Highlights

- Reduces product returns (RMAs) by as much as 50% by detecting marginal parts
- Increases quality and reliability by killing or downgrading outlier units
- Supports automatic bin switching for quality indexing
- Saves packaging costs by catching outliers at wafer sort
- Manufactures intelligence to enhance quality results from multiple test processes, including: E-Test, Wafer Sort, Final Test, System-Level Test

Outlier Detection, Reduced DPPMs

High quality semiconductor devices are no longer exclusively the realm of automotive and medical ICs. Employing advanced PAT algorithms, Optimal+ Outlier Detection captures quality issues within the outlier process and controls the publication of outlier rules to test floors in a closed-loop process, enabling the detection of a wide variety of quality issues which could lead to a test escape.

Based on hundreds of post-mortem data analyses conducted on units returned by customers, Optimal+ designed and developed the Outlier Detection solution, enabling a paradigm shift in the semiconductor industry. For the first time, passing devices are being challenged in a timely manner before shipping to further increase product quality. Outlier Detection can be easily integrated into any manufacturing environment.

Outlier Detection Solution

How It Works

1



ANALYZE DATA

When RMAs are identified, users can extract the full “DNA” test history for that part based on ECIDs (electronic chip IDs) to perform cross-operational data mining and analysis

2



CREATE RULES

When a “DNA-signature” is identified for a specific RMA, rules are defined to “catch” similar RMAs during manufacturing test

3



SIMULATE SCENARIOS

Simulation is performed using the newly-created rule leveraging historical test data (saved and stored by Optimal+) to verify that the targeted RMA excursion was successfully prevented

4



PUBLISH TO SUPPLY CHAIN

Once a rule is green-lighted for achieving its intended goal, it can be propagated to the entire tester fleet

5



CONTINUAL MONITORING AND VALIDATION

As future devices are tested, engineering teams can track bad bin failures based on the published Outlier Detection rules to confirm that suspect devices are prevented from entering the supply chain