proteanTecs

Datacenter Chipmaker Prevents a Quality Crisis Sparked by Wafer Sort Blind Spots

Case Study

Discover how the fabless chipmaker used proteanTecs on-tester and cloud analytics to prevent a flood of RMAs with ML-powered spatial analysis

PREVENTED AN EPIDEMIC
Widespread system deployment of affected material

SAVED >$250K
Packaging & testing of affected dies

SAVED >$5M PER YEAR
Until the root cause is fixed

The Customer

A fabless chipmaker making 7nm networking chips for datacenters

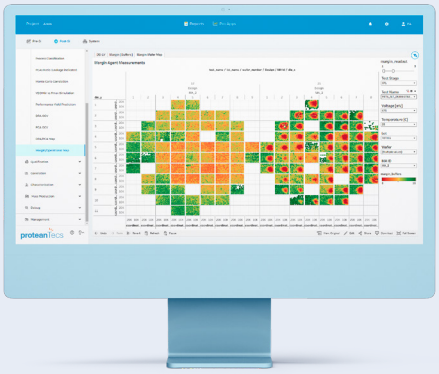
The customer, a groundbreaking semiconductor startup, develops high-throughput networking systems for advanced cloud infrastructure.

The Challenge

Heading toward numerous RMAs due to production test blind spots

The customer was at risk of a major reliability crisis without realizing it. A large percentage of the wafers contained low performing dies with only 80 [ps] margins, far below the required 300 [ps].

Unfortunately, these dies passed wafer sort, as the delta between test voltage and VDDmin was big enough to mask the issue. The low performing wafers passed undetected, with guard-bands too low for lifetime operation, potentially leading to numerous customer returns.



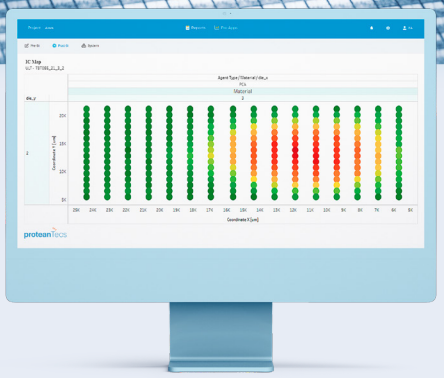
Spatial signature anomalies on the right, compared with a healthy wafer on the left

The Solution

Spatial analysis with deep data analytics

The customer embedded proteanTecs on-chip monitoring solution for improved visibility. The solution, which tracks the material on the tester in real-time, detected spatial signature anomalies, indicating substantial loss of timing margin.

The customer received a low timing margin alert in real-time from the proteanTecs ATE edge library and the customer's investigation in the proteanTecs cloud platform immediately showed spatial signatures across all chips of the low performing wafers. These underperforming circuitries had little margins left, increasing the risk of premature failures in the field.



Low performing dies exhibited low timing-margin areas marked in red, compared with expected timing-margin areas marked in green

The Results

Substantial quality and reliability improvement: To eliminate reliability risks, the customer decided to discard the low performing wafers. It has helped **prevent an epidemic** due to a mass deployment of affected material. The product launch was declared a success thanks to the inline insights of the deep data analytics tool.

Considerable cost saving: The early detection led to direct savings of over **$250,000** by preventing assembly, packaging and further testing (packaged device tests) of affected dies. Additionally, more than **$5,000,000** per year have been saved indirectly until the root cause had been fixed.

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