Case Study

Photodiode Burn-in, Reliability Testing, & Accelerated Life Testing

Electron Test Equipment

Application: Packaged multi-photodiode reliability testing for the Science and Technology Industry

Solution: Custom ATE Photodiode Burn-in & Reliability Test System, Custom DUT (Device Under Test) Board, combined with Thermal Environmental Chamber

Overview

This project required 256 photodiodes to be tested for reliability and performance. There were 4 photodiode reliability test stations built.

Challenges

Problem: No commercially available equipment could test a large quantity of photodiodes simultaneously while maintaining precision and repeatability.

The project required advanced reliability testing to evaluate both short-term performance and long-term durability under operational and accelerated conditions.

Testing Requirements: Testing dark current conditions from 200 nA to 1 mA at reverse bias voltage of up to 200 V DC and temperature of up to 175 degrees C.

Other Constraints: The photodiode interface was designed to test up to 256 photodiodes.

Approach

Equipment Used: Custom built system was selected as a back bone of the design to cater to accuracy and data consistency needed for this project. In this application, the measuring range was chosen from 200 nA to 1 mA.

Testing Protocol: The system was designed to be flexible with its user interface to adapt to various test procedures. These include varying light intensities and temperatures to assess performance. In this case, the testing temperature was up to 175 degrees C.

Analysis Techniques: The system provided a GUI display and data logging of the following information:

- FIT (Failure in Time) & Mean Time to Failure (MTTF) calculation
- Dark Current
- I-V tests and data collection

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Outcomes

Performance Metrics:

The customer is impressed with the performance of the system. Our photodiode reliability test system helped the team to analyze 256 photodiodes to make sure that the test results meet their design criteria.

Insights: The success of this initial project has positioned Electron Test Equipment as a key supplier for the project's expansion..

Conclusion

The successful performance of our photodiode reliability test system has greatly impressed the customer, helping them analyze 256 photodiodes to ensure the test results met their design criteria. This accomplishment has not only demonstrated the system's effectiveness but also solidified Electron Test Equipment as a key supplier for the continued expansion of the project.

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