

The Test Early, Test Often Strategy Applied to the Product Development Cycle

If it is not called out in a customer requirement, the testing sequence will require some planning. Depending on the application, some of the tests may need to be placed in sequence. The same group of 5 parts may go from one test directly to another to simulate a specific environmental condition. For example, a single group of parts may go from UV test directly to humidity or heat soak to simulate a humid island environment.

Once the sequence of tests is known, the duration of each test must be determined. In most cases the test is complete at a pre-determined time or interval. However, in some cases, the customer may request one interval, but the design group holds the product to a higher standard and may decide to extend the test length. In other cases, it may be necessary to run a test, collect the data at the determined “end of test” point, and then continue to run the test until the product fails. This can help determine the theoretical end of life under a given condition. In any case, it is important to have a well thought out test plan at the beginning of the new product development cycle.

Once the specific tests, duration, quantity, sequence, and outputs are determined, the test plan can begin to take shape. The table shown on the previous page is an example of a typical test plan that includes some of the variables discussed. It is easy to see that the heat soak and cold soak tests become gating items due to the extended time requirements. The test plan must meet all of the product durability requirements while considering the time constraints. When creating the test plan it is also wise to consider a contingency plan in the event that there is a failure during test.

In addition to a well thought out and properly documented test plan there are some other things to consider during product development. The “test early, test often” strategy can be used to check basic design and process assumptions. This is the strategy of conducting specifically targeted early environmental testing on selected subassemblies, components, or complete devices as early as possible in the design cycle. This allows the design team to gain an understanding of the design strengths and weaknesses before the design is frozen

and the final test plan is executed.

An environmental test strategy for new product development of microelectronic assemblies should be considered carefully. A well thought out test plan that includes a top-down approach, lead times and contingencies, measurable outputs, and a defined quantity of parts for analysis can be very cost effective. Integrating this test plan into a “test early, test often” strategy can further streamline early learning and ensure that objectives are met. New product development for microelectronic assemblies is very challenging and the proper strategy for environmental testing can get your product to market with the lowest overall development time and cost. ♦

References

- [1] “Engineering that Begins with the End in Mind”, *MEPTEC Report, Spring 2016, Volume 20, Number 1.*
- [2] William Boyce, “Precision Measurement for MEMS Sensor Applications”, *Tap Times, February 2017, Volume 8, Number 2.*

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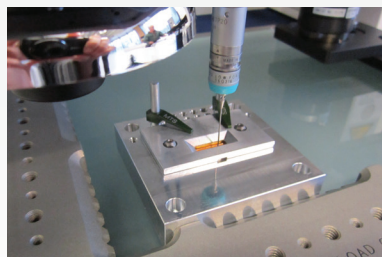
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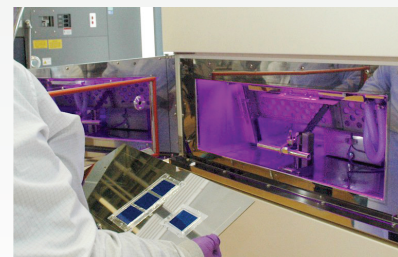
- Full-Service Microelectronic Assembly
- High Quality, Low Volume
- Innovative Microelectronic Products
- Custom Process Development
- Prototyping and Product Launch

TEST AND INSPECTION



- Root Cause Analysis to Reduce Cost
- Precision Dimensional Inspection
- Manage Incoming Material Quality
- Develop and Execute Test Plans
- Eliminate Early Life and Field Failures

CUSTOM SUPER UV TESTING



- Dramatically Reduces Test Time
- Enables Rapid Product Development
- Accelerates Product Life Prediction
- Provides Multi-Market Solutions
- Supports Industry Standards