Achieving Product Reliability with Automated Design Analysis Software

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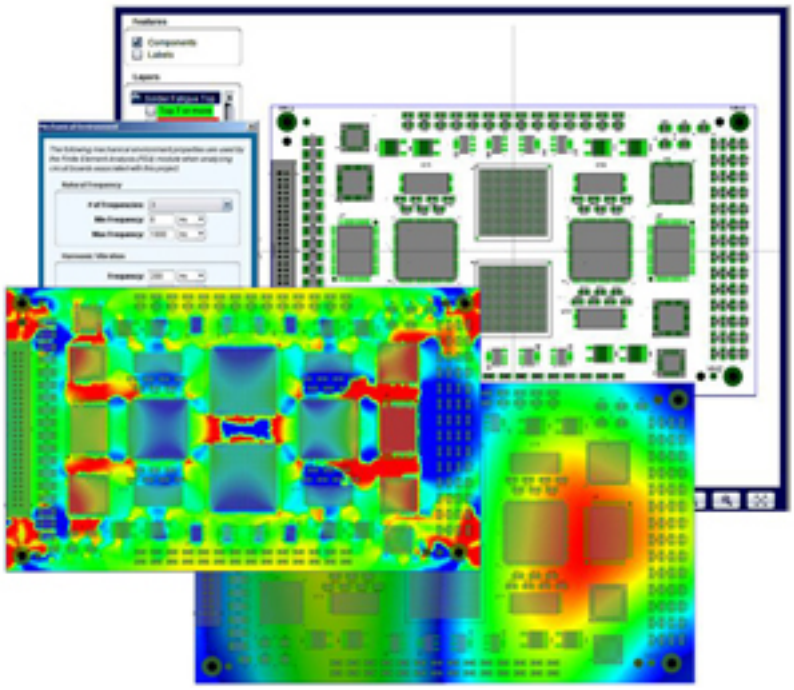
Swift time to market and product performance are essential to success in electronics manufacturing. The foundation of a reliably performing product is a robust design. Since the overall cost and quality of a product is most influenced by decisions made early in the design stage, it is critical that engineers and designers have the tools they need to develop better, more reliable products quicker and more efficiently.

Physics of Failure in Reliability Prediction

Based on the science of Physics of Failure and Design Rule Checks (DRC), Sherlock Automated Design Analysis software, by DfR Solutions, has transformed the process of analyzing, grading, and certifying the expected reliability of electronics products at the circuit board level. The new tool enables electronics manufacturers to predict design weaknesses well before the first prototype is ever built.



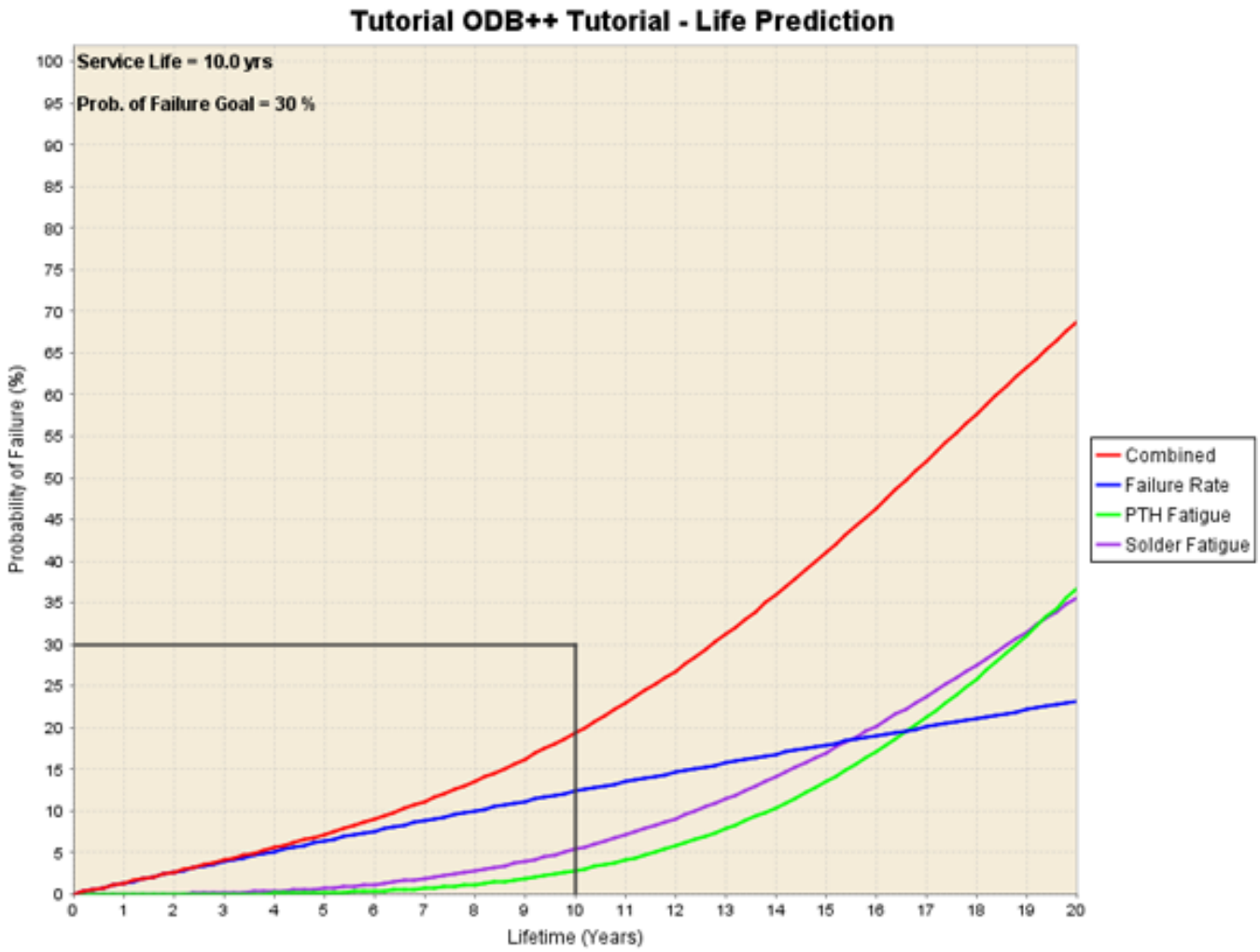
The concept of Physics of Failure,

also known as Reliability Physics, involves the use of degradation algorithms that describe how physical, chemical, mechanical, thermal, or electrical mechanisms evolve over time and eventually induce failure. Traditionally, this approach was too time consuming to be a part of the product development process and therefore these issues were not evaluated until final test. But Sherlock's intuitive interface and modular architecture allows designers to quickly perform these complex simulations,identifying design weaknesses, conducting tradeoff analyses, and predicting field performance even before first prototype.

How it Works

A user starts the process by importing standard design files. Sherlock's intelligent file identification and part selection makes this process a quick and easy, ensuring the product is virtually re-created within Sherlock with correct design features, dimensions, and materials. The user then provides information on the expected test or use environments or selects from one of Sherlock's numerous preset applications. One of the additional benefits of the software is that it requires the product development team to consider and define expectations of product performance (MTBF, years of service, etc.).

Sherlock is now ready to analyze and predict. Embedded three-dimensional finite element engine provides accurate predictions of performance under shock and vibration. Modification of the product is relatively easy with Sherlock, allowing designers and engineers to effectively quantify the benefits of various product architecture, mechanical attachment and thermal management strategies. Each distinct module provides the user guidance on at-risk components and expected failure rates over time. Sherlock also provides an overall executive-level green/yellow/red if the design can proceed to production and test.



The Performance and Profitability Pay Off

It is well known that designing in reliability up front pays off over the life of the product, but prior to Sherlock, there have been no tools available that quickly, easily, and effectively estimated the wear-out life of an electronic product. Now Sherlock software provides rapid assessment of electronic systems reliability using the science of Physics of Failure enabling electronics manufacturers to improve overall product performance, speed time to market, and increase profitability.

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