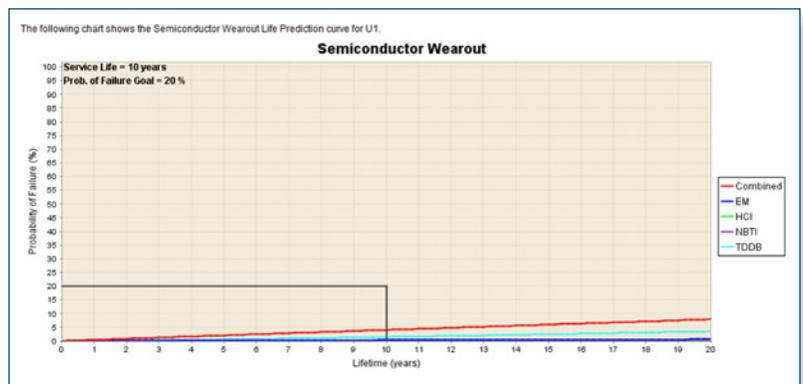




Predict Semiconductor Wearout with Sherlock 5.2

Do your products operate in extreme environments or require long lifetime performance? Then **Sherlock Automated Design Analysis™ Software version 5.2** is for you. With the addition of the **Semiconductor Wearout Analysis module**, manufacturers with high performance, high reliability needs can evaluate and predict the risk of semiconductor wearout and assure optimal lifetime performance and reliability.

Over time, the semiconductors used in electronics components experience degradation and ultimately fail. The more complex the electronics, the more likely a failure will occur. Manufacturer's testing is limited and industry specific requirements like MIL-HDBK-217, SR-332, and FIDES, are based on outdated statistical analyses that do not account for real world conditions. The Semiconductor Wearout Module in Sherlock 5.2 is a more accurate, physics-based prediction of semiconductor failure rates.



PHYSICS OF FAILURE

The Semiconductor Wearout Analysis module in Sherlock 5.2 uses a combination of publicly available data and physics of failure (PoF) degradation models to predict the minimum reliability of a component. By using PoF, this capability frees users from the limitations and inaccuracies inherent in assuming a constant failure rate and a simple Arrhenius relationship.

This form allows you to edit part properties. The choice field to the right of each property indicates the data source for the current property value. You may select a different source to use another value or edit the property value directly. In that case, the source will be automatically changed to User. Double-click any field label to toggle confirmation status for that field. Part properties and tabs that are not applicable because of other property settings are grayed out, but may still be edited.

Confirmed Un-Confirmed Guess Unknown

Part Editor - U1

ID	?	Test Method:	BLACK BOX	User
Pkg	?	Test Duration (hrs):	1000	User
Loc	?	Number of Devices:	77	User
Lead	?	Number of Failures:	0	User
Pad	?	Confidence Bounds (%):	60	User
Ball	?	Test Temperature (C):	150	User
Solder	?	Test Voltage (V):	5.5	User
Elec	?	Test Frequency (MHz):	100	User
Therm	?			
Die				

FIRST AGAIN!

Sherlock is the first and only tool to predict the four basic semiconductor failure mechanisms:

- ✓ Hot Carrier Injection (HCI)
- ✓ Time Dependent Dielectric Breakdown (TDDDB)
- ✓ Negative Bias Temperature Instability (NBTI)
- ✓ Electromigration (EM)



FIVE OPTIONS TO SUIT YOUR SPECIFIC NEEDS

Different industries have different needs. Sherlock predicts semiconductor wearout 5 ways, from a basic prediction using field data and service life to a more complex analysis requiring temperature specific, test results, and calculated factors. Semiconductor Wearout Module Options include:

- 1. Prediction and User Field Data**
 - User requires lifetime prediction for a given reliability and service life
 - Data Source: User provides reliability from field data and service life
- 2. Temperature Specific and Acceleration Factors**
 - User requires lifetime prediction based on temperature specific parameters
 - Data Source: Manufacturer provides temperature specific prediction and user provides acceleration parameters
- 3. Test Results and Acceleration Factors**
 - User requires lifetime prediction based on component test results
 - Data Source: Manufacturer or user provides test results and acceleration parameters
- 4. Temperature Specific and Calculated Factors**
 - User requires lifetime prediction based on temperature specific parameters and industry generic models and user defined parameters or Sherlock defined parameters
 - Data Source: Manufacturer provides temperature specific prediction and uses user defined or Sherlock defined parameters to calculate acceleration factors
- 5. Test Results and Calculated Factors**
 - User requires lifetime prediction based on test results and industry generic models and user defined or Sherlock defined parameters
 - Data Source: Manufacturer provides or user provides test results and uses user defined or Sherlock defined parameters to calculate acceleration factors

In addition to groundbreaking semiconductor wearout analysis, Sherlock Version 5.2 provides users with:

- ✓ **IPC-2581 Full Function Mode Files Import and Support** that enables them to create a new project within Sherlock or to define a new circuit card within an existing project. This import process is like other supported import formats like ODB++; IPC-2581 is an open global standard for assembly and manufacturing data supported by the IPC-2581 Consortium.
- ✓ **Part Modeling** with the capability to selectively enable and disable FEA modeling for a specific part.
- ✓ **Modified Lead Modeling** method that utilizes multiple elements, as needed, to model lead feet and shoulders. This modified method produces better FEA results for leads with long feet and/or shoulders.

Learn more about Sherlock at dfrsolutions.com/software
Get your free trial at dfrsolutions.com/software/sherlock-free-trial
Give us a call at **301-474-0607**

DfR Solutions
RELIABILITY DESIGNED & DELIVERED