



CASE STUDY /

Ansys Sherlock Helps Modify Testing Parameters

An electronic engineering (E/E) module supplier had to meet an automotive OEM's reliability metric of 97% (less than 3% risk of failure) over a 10-year durability period for a new E/E module. To determine whether the supplier's product meets the reliability goal, the automotive OEM requested that the modules be subjected to thermal cycling tests with OEM-defined parameters.

/ Challenge

The E/E module supplier's product operated throughout the tests; however, post-test tear downs revealed that the module had suffered cracks in solder joints due to solder fatigue. As a result, the automotive OEM rejected the supplier's new module.

/ Technology Used

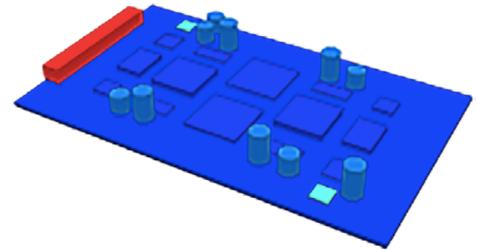
- Ansys Sherlock

/ Engineering Solution

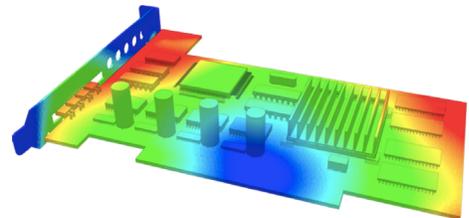
The E/E module supplier suspected that the automotive OEM's thermal cycling parameters were unnecessarily severe. The supplier commissioned the use of Ansys Sherlock to test the module's field durability against the thermal cycling tests using simulation-aided testing. A 3D FEA model was built of the supplier's E/E module in a CAE environment, using the OEM's definition of annual thermal cycling to model the 10-year field profile.

/ Benefits

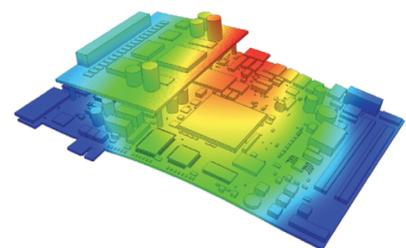
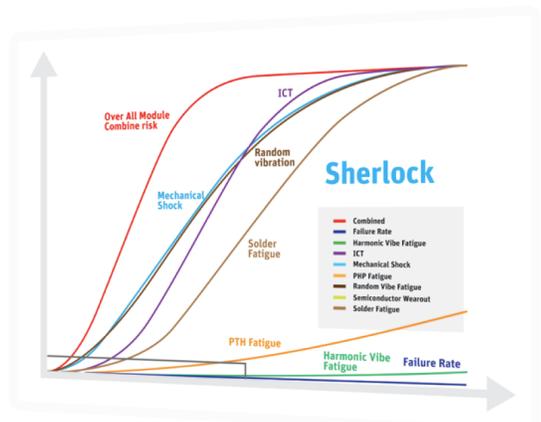
- Sherlock's analysis found that the OEM's 10-year life test correlated to what would be a 20.2-year field life, more than doubling the OEM's intended lifespan.
- Sherlock determined that the supplier's module achieved a successful 10-year life at 49% of the OEM's thermal cycling test time.
- Sherlock demonstrated that the risk failure for the supplier's module was 1.8%, a reliability metric of 98.2%.
- After careful review of Sherlock's analysis, the OEM accepted the supplier's module, and the OEM modified their testing parameters for future reliability qualification programs.



Sherlock showing thermal displacement.



Sherlock showing thermal derating of the board.



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