

Thermal simulation of PCBs using ANSA ECAD Importer, ANSYS Fluent and META

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ABSTRACT

Thermal simulations of printed circuit boards (PCBs) are becoming increasingly crucial in design and pre-deployment testing of electronic products. High temperatures cause over 50% of electronic equipment failures, according to a study by the US Airforce Avionics Integrity Program. Therefore it is very important to have robust and reliable simulation methods to assess the risk of a thermal failure and to eliminate or mitigate it. We present a novel workflow that uses ANSA for pre-processing and ANSYS Fluent as a conjugate heat transfer solver to perform accurate and efficient thermal simulations of PCBs. The main tool that is used for preparing the FE model is the ECAD Importer plugin of ANSA that can produce a high-quality structured solid mesh with the metallization of the PCB mapped onto it. This so-called "trace mapping" method reduces the simulation footprint (CPU time and memory) significantly while maintaining adequate accuracy for thermal failure predictions.