SIEMENS
Ingenuity for life

Simcenter FLOEFD Electronics Cooling Center Module

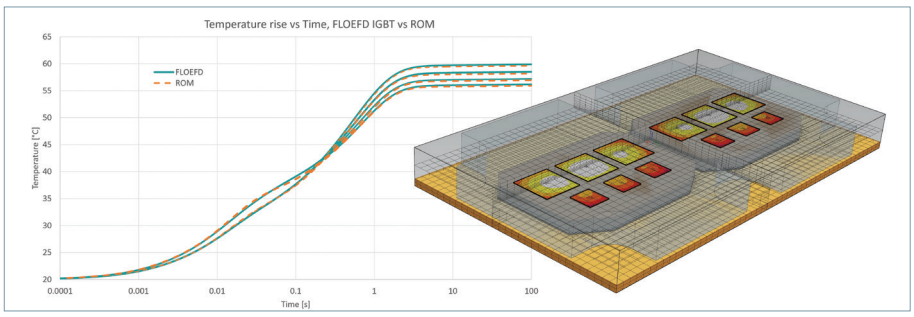
Combining the best electronics related capabilities of Simcenter FLOEFD and Simcenter Flotherm for accurate thermal simulation of electronics inside CAD

Benefits

- Frontload powerful thermal design simulation and design space exploration in CAD to prevent re-spins and eliminate costly physical prototyping
- Access best-in-class functionality from both Simcenter FLOEFD and Simcenter Flotherm to make thermal analysis even easier and faster
- Validate electronics cooling system performance to ensure reliability and long product life

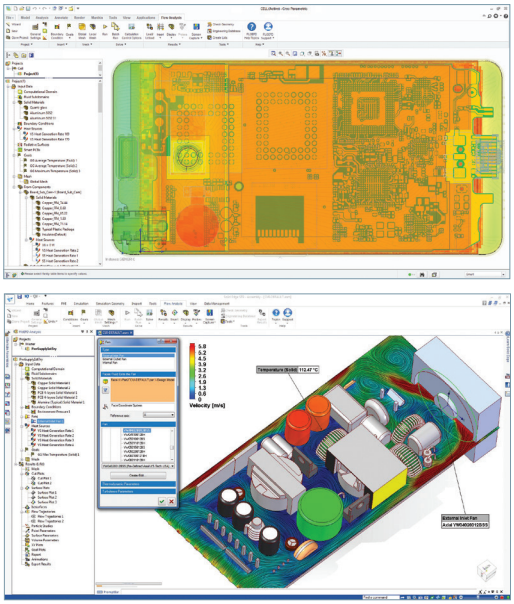
Summary

Part of the Xcelerator portfolio, Simcenter™ FLOEFD™ software is a frontloading computational fluid dynamics (CFD) solution that is embedded in computer-aided design (CAD) software, so you can simulate airflow and heat transfer using 3D CAD models without the need for data translations or copies. Depending on your needs, there are several electronics cooling specific modules which may suit your needs.



3D thermal simulation of a power electronics component compared with a BCI-ROM simulation.

The Simcenter FLOEFD Electronics Cooling Center module combines the electronics specific power of Simcenter Flotherm™ with Simcenter FLOEFD inside your preferred CAD environment including NX, Solid Edge, Creo and CATIA V5. It features powerful functionalities to help you quickly and accurately predict thermal behavior of electronic devices, validate electronics cooling system performance to achieve long product life and easily explore methods for cooling in complex electronic assemblies.



Thermal simulation of an electronics device.

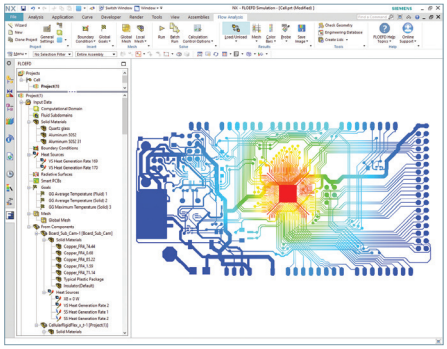
Simcenter FLOEFD Electronics Cooling Center Module

The Simcenter FLOEFD Electronics Cooling Center is a compilation of several modules and functionalities namely:

Simcenter FLOEFD Electronics Cooling Module
This module offers:

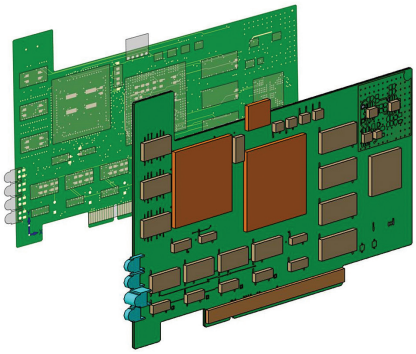
- Joule heating for calculating steady-state direct electric current in electro-conductive solids. The calculations of electric potential and current can be performed only in conductive solids; for example, metals and metal-containing composite materials. Electrical resistivity of the material may be isotropic, anisotropic or temperature dependent.
- Compact models for facilitating simulation of electronics equipment. This module offers two-resistor compact model that is test-based on an approved Joint Electron Device Engineering Council (JEDEC) standard; built-in library of two-resistor models of standard JEDEC package outlines; Heat pipe compact models.
- PCB generator for obtaining the bi-axial thermal conductivity values. Thermal conductivities can be automatically derived from the PCB structure and the properties of the specified conductor and dielectric materials can be accessed.
- Robust materials library: In addition to the basic materials, the following databases are also included: 1,000+ fans from different manufacturers; solids materials such as alloys, ceramics, metals, polymers, laminates, glasses and minerals and semiconductors; integrated circuit (IC) packages; single- and multi-stage thermoelectric coolers (TEC); interface materials (contact thermal resistance); and two-resistor components.

For more detailed information please refer to the Simcenter FLOEFD Electronics Cooling Module flyer.



Simulation of an electronics device.

Simcenter FLOEFD EDA Bridge Module
The powerful Simcenter FLOEFD EDA Bridge lets users import detailed PCBs with material and integrated circuit (IC) thermal properties into Simcenter FLOEFD for thermal analysis either on their own, or as part of a larger system-level assembly.



From EDA data to 3D CAD imported PCB.

The imported PCBs can be represented as fully detailed 3D geometry with copper traces, a PCB component with bi-axial thermal conductivity values or as a Smart PCB. The SmartPCB is a mesh independent representation of the PCB that allows for very fast and accurate solving of detailed PCBs. In addition, it allows the import of PDML files.

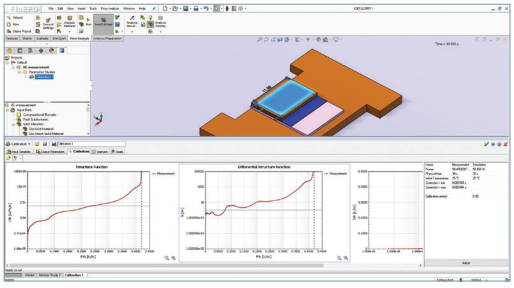
The following PCB import file formats are supported: IDF, CC and CCE (native file format for Siemens Digital Industries Software's Xpedition and PADS), ODB++ (neutral file format for PCB manufacturing), ProStep (*.idx, *.idz, *.xml) as well as IPC2581B (neutral file format of the IPC Digital Product Model Exchange consortium).

For additional information, please refer to the Simcenter FLOED EDA Bridge Module flyer.

Simcenter FLOEFD T3STER Automatic Calibration Module
Used in conjunction with Simcenter FLOEFD software, the Simcenter™ FLOEFD T3STER™ Automatic Calibration module helps increase the accuracy of electronics cooling studies.

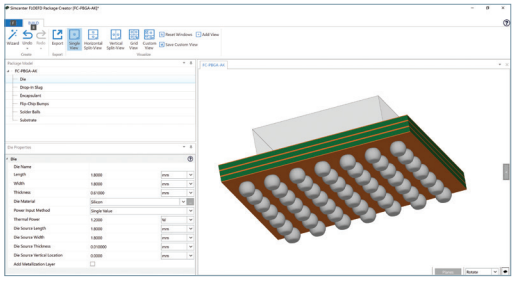
Semiconductor package characteristics data used in simulation can differ from reality due to the lack of knowledge about the internal structure. With the help of Simcenter FLOEFD T3STER Automatic Calibration module, you can increase your data accuracy. It lets you use the true package internal structure and material properties from measurement with Simcenter T3STER, to drive even more accurate simulations. The calibration mode of the parametric study searches for package dimensions and material properties to fit the measured data to provide a calibrated CFD model for more accurate simulations.

For additional information, please refer to the Simcenter FLOEFD T3STER Automatic Calibration Module flyer.



Automatically calibrated package thermal model.

Simcenter FLOEFD BCI-ROM and Package Creator Module
The Boundary Condition Independent Reduced Order Model (BCI-ROM) functionality extracts a dynamic compact thermal model for a range of heat transfer coefficient values defined in the original Simcenter FLOEFD model. This model solves faster than a 3D CFD simulation while maintaining predictive accuracy in space and time. Using BCI-ROM you can also convert a task into a thermal netlist which can be used by a SPICE (Simulation Program with Integrated Circuit Emphasis) compatible electro-thermal system simulation tool.

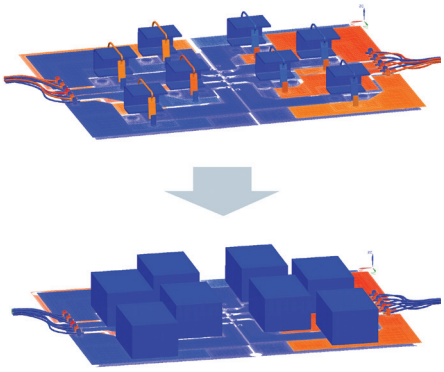


Thermal simulation of a power electronics package.

The Package Creator enables you to quickly create thermal models of electronic packages. To create a package, you can specify various components such as the encapsulant, die, die-attach, leadframe, die-attach pad and bond wires for a more accurate thermal model.

For additional information, please refer to the Simcenter FLOEFD BCI-ROM and Package Creator Module flyer.

Electrical Element
This thermo-electric compact model allows you to add a component into a direct current (DC) electro-thermal calculation by the given component's electrical resistance. The corresponding Joule heat is calculated and applied to the body as a heat source. There are two types of electrical elements, resistors and wires: the resistor element uses the total electrical resistance provided and the wire element automatically calculates the resistance based on the wire's material properties, length and cross section area. Optionally you may also specify the thermal resistance of the wire's insulator.



Simulations, using accurate thermo-electrical compact models.

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