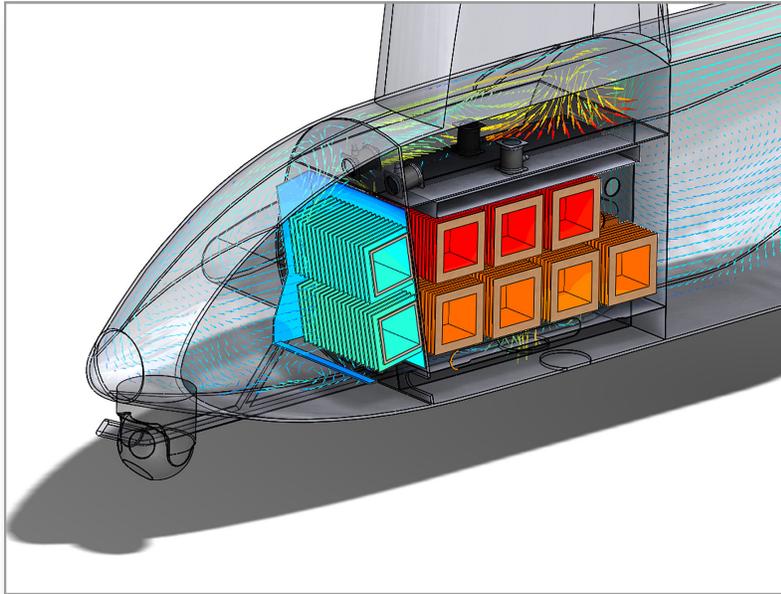


## FloEFD Electronics Cooling Module



The Mentor Mechanical Analysis Division has been a leader in electronics cooling since 1989 and has pioneered thermal characterization and analysis of ICs and LEDs. FloEFD, its award-winning frontloading CFD software, was designed to work inside CAD software so you can simulate airflow and heat transfer using 3D CAD models, without any need for data translations or copies.

**The Electronics Cooling Module for FloEFD provides additional capabilities for special analyses. Physical capabilities added to FloEFD are:**

### Joule Heating

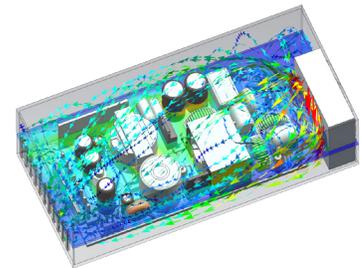
FloEFD is able to calculate steady-state direct electric current in electro-conductive solids:

- The Joule heating effect is automatically calculated and included in heat transfer calculations
- The calculations of electric potential and current are performed only in conductive solids, i.e. metals and metal-containing composite materials
- The electrical resistivity of the material may be isotropic, anisotropic or temperature dependent

### Customer Testimonial:

"The people who don't have much experience of analysis can use it easily... It was important that the tool integrated with Pro/ENGINEER. We didn't want to have to create another model for analysis and being CAD-embedded we could validate various analysis models repeatedly. We also wouldn't have any difficulty in switching between processes (from design to analysis)."

*Seiko Epson*



### "What-if?" Testing Made Easy

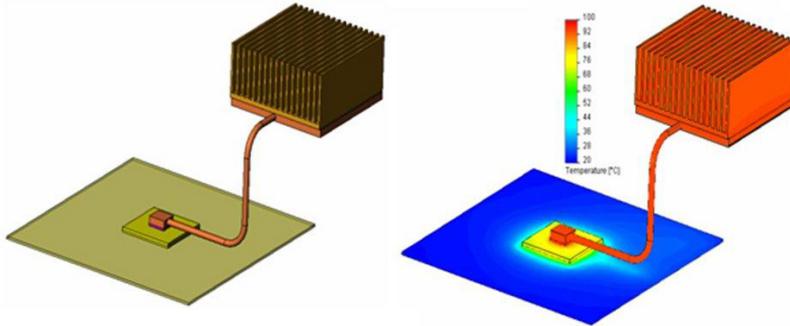
One of the most powerful features of FloEFD is the ease with which you can conduct "what-if?" analyses.

FloEFD makes it simple to modify your models and analyze design variations. The process is very simple. Create your base model and analyze it. Then create multiple variations of your design by modifying the solid model without having to reapply material properties etc. Using its parametric study and design comparison functionality, you can easily compare the results among the various options to choose your best possible design. When you are satisfied with your design, publish your report at a touch of a button. You can even publish a fully interactive 3D dynamic plot and share it with colleagues or customers.

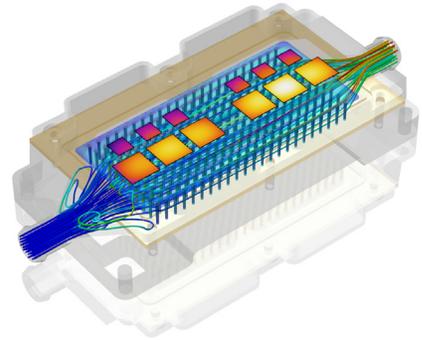
## Compact Models

To allow for simulation of electronics equipment, the following compact models are offered in this module:

- Two-resistor compact model
  - They are test-based on an approved JEDEC standard
  - Built-in library of two-resistor models of standard JEDEC package outlines
- Heat pipe compact model
- Printed Circuit Board model including PCB generator (more details below)



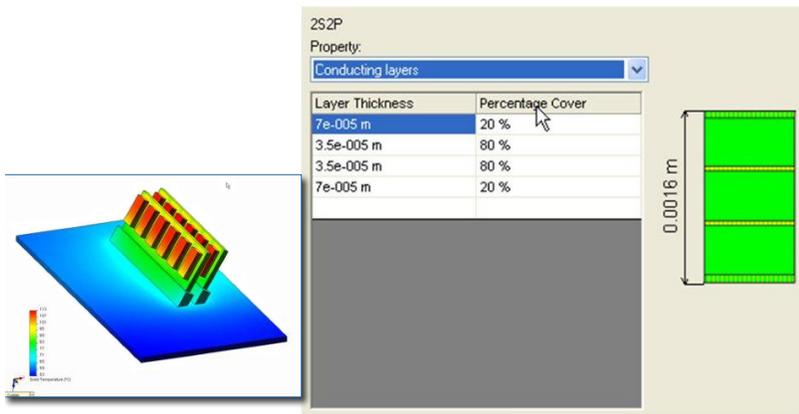
FloEFD is based on Navier-Stokes equations and can predict both laminar and turbulent flows. FloEFD employs one system of equations to describe both laminar and turbulent flows. Moreover, transition from a laminar to turbulent state and/or vice versa is handled automatically.



## PCB Generator

To obtain the bi-axial thermal conductivity values, the following functionality is also available:

- Normal (through plane) and in-plane thermal conductivities automatically derived from the PCB structure and the properties of the specified conductor and dielectric materials
- The board can also be arbitrarily oriented with respect to the global coordinate system
  - i.e. angled PCBs can be modeled



## Customer Testimonial:

"We have 8 designers in our group and three use FloEFD. You can use it once every three months because you won't forget how to use it! The special thing about FloEFD is that you are closer to reality in this software."

*Orbotech*

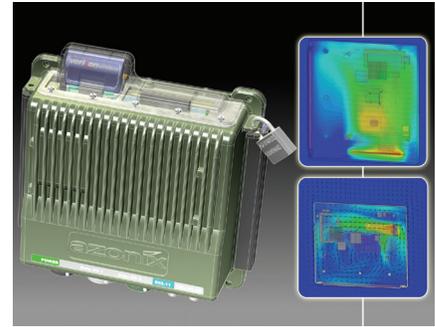
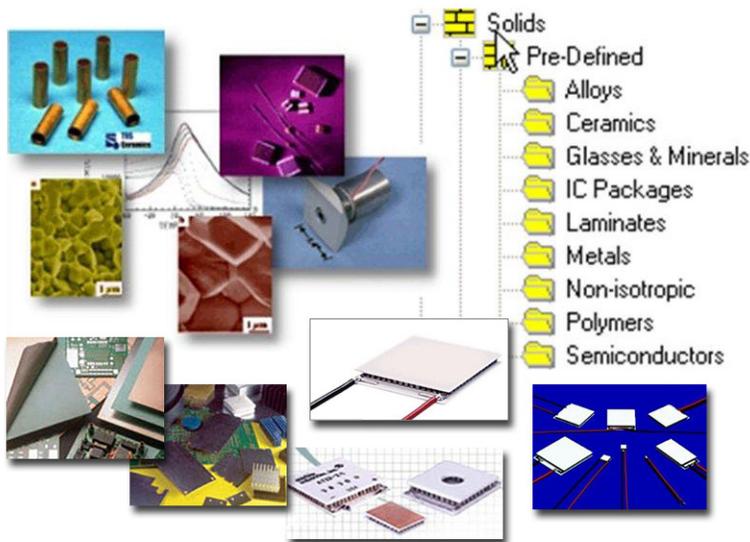
## Materials Library

In addition to the basic materials, the following are also included in this module:

- More than 1000 fans from different fan manufacturers
- Database of solids materials such as alloys, ceramics, metals, polymers, laminates, glasses and minerals, semiconductors
- Database of IC packages
- Database of single- and multi-stage Thermo-Electric Coolers (TEC)
- Database of interface materials (contact thermal resistance)
- Database of two-resistor components

## FloEDA Bridge - An Optional Add-on Module

- Interface between FloEFD and PCB board design, supports the following EDA formats: xPCB Layout (Expedition PCB) files (version 7.9.3 or higher), IDF files, ODB++ files.



### Customer Testimonial:

"FloEFD computational fluid dynamics software enables design engineers without a fluid analysis background to perform thermal simulation. The result is that we got the design right the first time, only had to make one prototype and avoided expensive design changes that typically occur in the late stages of the development process."

*Azonix*

**For the latest product information, call us or visit: [www.mentor.com/mechanical](http://www.mentor.com/mechanical)**

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