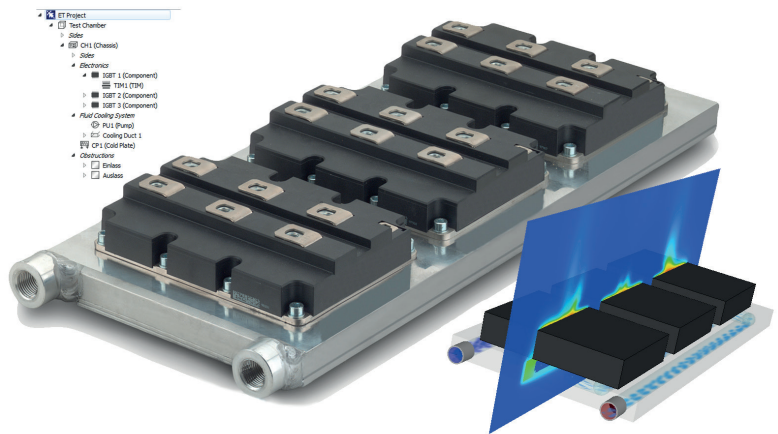


## Computer based thermal simulation for optimal cooling concepts

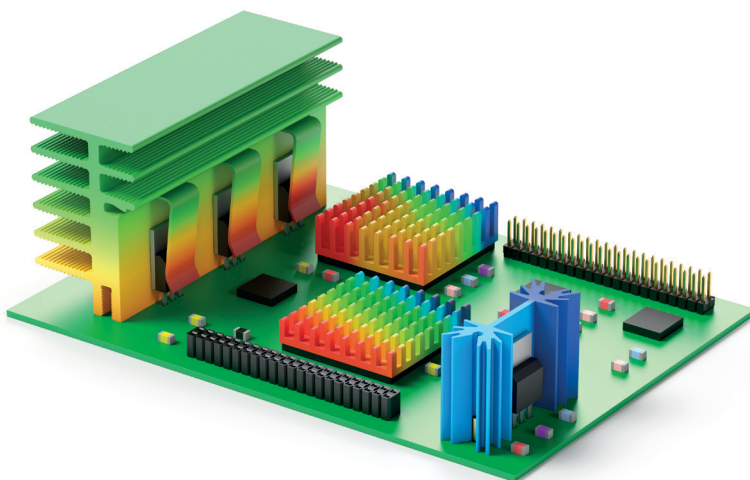
Performance, service life and reliability of electronic semiconductor devices are significantly determined by the thermal load to which the devices are exposed. An exceeding of the maximum operating temperature leads to malfunctions. An exceeding of the permissible junction temperature leads to a destruction of the semiconductor. To make it worse there is an advancing trend in the semiconductor industry for continuous increasing integration- and power densities of electronic devices. For the solution of thermal problems the first question is which kind of heat dissipation has to be considered. For this there are different processes available: by means of free convection (passive) with different heatsink solutions, by means of forced convection (active with help of fans, cooling aggregates) or by means of fluid media (fluid cooling).

However, electronic devices and systems have many different boundary and installation conditions. Therefore the choice of the optimum thermal management is often difficult. There are surely possibilities to find the right heat dissipation concept by using the thermal resistance for calculations or by testing and verifying prototypes directly in the application, but nowadays customer specified mechanical adjustments are requested and demanded more than ever. Small mechanical post-machinings, such as additional integrated threads or drilling can be considered in the calculation with safety reserves in the temperature of the thermal resistance, but extensive modifications demand a repeated inspection of the thermal circumstances.



To facilitate the determination of passive heat dissipation concepts Fischer Elektronik offers a computer based thermal simulation as a kind of service.

### Considered factors in the thermal simulation



With help of the computer based thermal simulation the necessary characteristics of the cooling concept can be determined exactly. Based on physical concepts such as mass, energy and impulse the software especially considers the thermal requirements for free or forced convection. Simultaneously the system is aligned to thermal dissipation by means of fluid. Moreover the thermal simulation calculates physical effects such as thermal radiation and turbulences. The emission factor of the different surfaces also plays its role. As a result the simulation software delivers a precise cooling solution for the application and is a big help for the decision-making and interpretation of the electronic design.

### Advantages of a computer based simulation

The computer based thermal simulation is already used for the prototype development. Herewith the development cycles of heat dissipation concepts is reduced considerably. Unsuitable concepts can be discarded quickly and without big costs of material. A lot of features and options of the simulation system also reduce the temporary and apparatuses efforts compared to a conventional simulation in the measurement chamber.

We will be happy to advise you in detail about the theme thermal simulation.

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