

DIGITAL INDUSTRIES SOFTWARE

Simcenter Flotherm XT

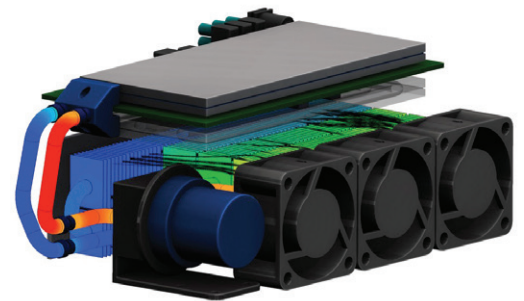
Close your thermal design faster, minimize rework and physical prototyping, and free up valuable engineering resources for innovation.

Benefits

- Frontloading thermal design prevents late-design re-spins and can eliminate physical prototyping
- Workflow embedding and supply chain support through drag-and-drop library capability
- Right-by-design cooling solution minimizes product weight and cost
- Use to choose cooling architecture in ideation to final design verification
- Smartparts™ support rapid model creation
- Fast and robust meshing and solution supports fully-automated design space exploration and design optimization

Summary

Electronics are increasing the complexity of products across all industry sectors, including automotive and transportation, aerospace and defence, electronics and semiconductor, and consumer products. While product complexity is increasing, the time and budget for product design is shrinking. Miniaturization is forcing the mechanical and electronic design flows to converge, and is increasing power densities. This makes it harder than ever to efficiently remove heat, which causes performance and reliability problems, and can cause safety concerns. Frontloading electronics cooling specific thermal design software is helping companies develop products that are light, thin, silent and lower in cost.



Liquid cooled autonomous vehicle sensor fusion box.

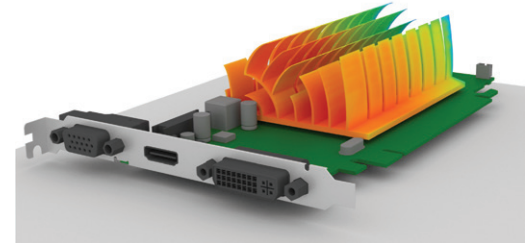
Benefits *continued*

- Japanese and Simplified Chinese is supported in the user interface
- Standard and Ultra versions are available, with the Ultra version supporting transient simulations, rotating regions, design of experiment and response surface optimization
- Unique Flexx licensing option gives access to run either Simcenter™ Flotherm™ or Simcenter™ Flotherm™ XT

Simcenter Flotherm XT offers the solution

A complete set of Smartparts, intelligent multi-level model creation macros providing detailed and compact representations in a single object, is provided. Smartparts combine geometry definition, material attributes and grid settings supporting easy model creation, and re-use across different projects. Supported Smartparts cover everything from semiconductor dies to enclosures.

Simcenter Flotherm XT has a Windows explorer-style user interface that incorporates a Parasolid-based solid modeller with drag-and-drop functionality a library system. Model sharing across the electronics supply chain is supported through hundreds of Smartparts-based objects and attributes available in an installed library including fans, blowers, components, heatsinks, materials, thermal interface materials and more.



Graphics card with aesthetic heatsink design, showing heatsink temperature.

Modeling electronics assemblies

At the heart of electronics products are populated printed circuit boards PCBs. Simcenter Flotherm XT provides a wide range of PCB modeling levels to maximize solution speed and accuracy as data becomes available across the development workflow.

Simple block models use an empirical approach to calculate the effective PCB thermal conductivity in early design before the details of the board or layout are clear. In late design, material maps allow the spatial location of copper traces, vias, ground and power planes to be accurately captured. Thermal territories can be used to directly model the 3D copper structure under and around a component for the highest possible accuracy. Individual nets can also be considered to calculate Joule heating effects in traces, power and ground planes.

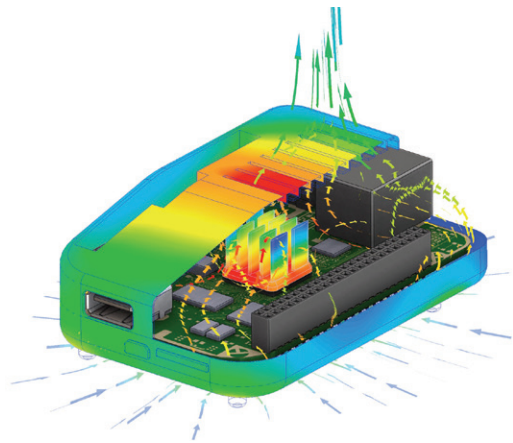


Fansink cooling performance test.

Modeling chip packages

Simcenter Flotherm XT supports a wide range of component thermal models. Fast evaluation of architectural choices and design space exploration during conceptual design is enabled using simple block and 2-Resistor models. Detailed, 2- Resistor and DELPHI thermal resistor models can be created with Simcenter Flotherm PACK Software-as-a-Service.

Responses of the actual part in different environments can be measured with Simcenter T3STER™ and Simcenter POWERTESTER™. RC ladder models derived from these measurements can be used directly in Simcenter Flotherm XT for use in transient simulations to investigate transient effects and evaluate temperature control strategies.



Small consumer electronics product showing surface temperature and airflow.

Using the Ultra version, detailed thermal models can be calibrated against the measurement data, tuning model parameters to match provides the response of the actual part, to provide greater than 99% model accuracy in both space and time.

Detailed CAD-based 3D thermal model can be created with Simcenter Flotherm XT Package Creator software for common chip package families including internal features such as lead frame fingers and bond wires.

Conduction, convection, radiation, phase change and solar loading

Electronics cooling applications require full conjugate heat transfer as the norm, not as a special case, along with the ability to account for solar loading and thermal radiation between the large numbers of objects that typically make up an electronics system.

Multiphysics simulations are supported, capturing Joule heating in electrical conductors such as power supply nets and power planes, and even in bond wires in power packages. Multiphysics modeling also captures the latent heat effect of packaged phase change materials (PCMs).

Working with MCAD data

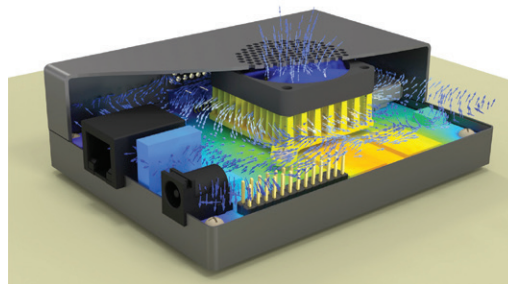
Simcenter Flotherm XT incorporates a parasolid-based solid modeller giving a CAD-centric user experience and ability to work directly with native CAD geometry. Native geometry can be imported from Siemens NX™ and Solid Edge®, PTC Creo® Parametric and Dassault Systemes SOLIDWORKS® and manipulated directly within Simcenter Flotherm XT.

Working with ECAD (EDA) data

Simcenter Flotherm XT's EDA Bridge module imports IDF, .idx, ODB++, CCE and IPC2581 files. Using the EDA Bridge modules components can be swapped for thermal models from the library, and components can be filtered on import based on size, power, and power density, with thermal power lists imported and exported as .csv files.

Workflow integration

Simcenter Flotherm XT imports Simcenter Flotherm PDML project and assembly files. ECXML support provides thermal model interchange with tools from other vendors. Simcenter Flotherm XT also imports thermal models in JEDEC JEP30-T100 format.



Industrial IoT Device.

Temperatures can be exported from Simcenter Flotherm XT for use downstream in FEA software for thermomechanical simulations for reliability assessment.

Fast, robust meshing and solution

Simcenter Flotherm XT’s unstructured Cartesian-based SmartCell™ meshing technology provides rapid refinement around small geometric features, with the ability to ignore unwanted details. CAD geometry of any complexity can be handled without the need for user simplification. Simcenter Flotherm XT delivers fast, robust meshing, with multicore parallel solution on Windows with remote solving capability on Windows or Linux.

Mesh settings are associated with the geometry preserving resolution if objects are moved within the model or added to the library for future use and sharing.

Post-processing

Comprehensive post-processing capabilities provide plane, surface and iso-surface plots, complemented by call-outs on plots to annotate simulation result values. Patented BottleNeck (BN) number helps identify aspects of the design that can be exploited to improve cooling.

Design space exploration and optimization

Simcenter Flotherm XT’s build in parametric study capability provides an efficient way to investigate the effects of varying input parameters. Parametric study capability can be extended with Design-of-Experiment (DoE) and Response Surface Optimization (RSO).

Simcenter Flotherm XT is also accessible through the HEEDS™ portal for multidisciplinary optimization using HEEDS.

Free 30-Day cloud-based trial

Not convinced? Try Simcenter Flotherm XT for yourself with a free 30-day cloud-based trial where you can become proficient in driving the software, and work through a series of self-paced tutorials to explore the full range of features available in Simcenter Flotherm XT.

Note:

Transient simulations, rotating regions, design of experiment and response surface optimization require an Ultra license.

Model calibration requires an additional license.

Simcenter Flotherm Pack Software-as-a-Service is licensed separately.

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