Automotive LED & Lighting Applications Design, Simulate, Test

MECHANICAL ANALYSIS
LED/Lighting

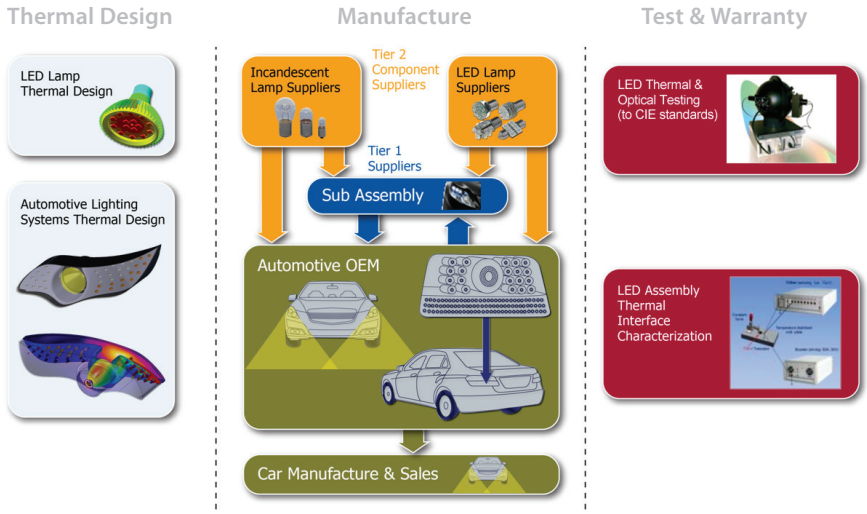
D A T A S H E E T

Mentor Graphics' Mechanical Analysis Division has been the leader in the simulation of electronics cooling and thermal characterization for the engineering community since 1989. Using Mentor Graphics' award winning hardware and software solutions, automotive OEMs, and tier 1 & tier 2 suppliers are overcoming reliability and warranty obstacles from upfront design through to manufacture and test.

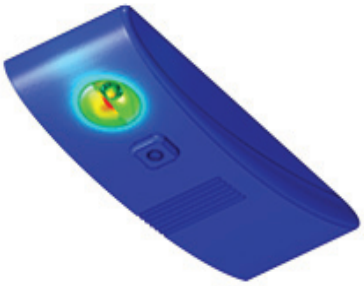
Thermal management is critical in automotive lighting design in order to meet performance, lifetime and cost requirements. Systems designers have a wide range of possible alternatives to consider in meeting thermal challenges. The latest generation of thermal testing hardware and fluid simulation software enables design engineers to diagnose thermal problems, evaluate alternative designs and iterate rapidly to an optimal solution. The final design can be qualified with measurements at the prototyping stage to ensure that manufactured tolerances (e.g. interface thicknesses) meet thermal design requirements and to identify any initial manufacturing problems. The knowledge gained can be used to improve future front, rear, turn, DRL and cabin lighting solutions.

Mentor's Unique Solutions Deliver High ROI to Automotive Lighting Manufacturers and OEMs.

Mentor's unique combination of Computational Fluid Dynamics (CFD) software and thermal and optical characterization hardware today plays a key role in preventing thermal related design issues. By stopping needless warranty and recall costs for expensive LED headlamps, ROI can be reached within a very short period of time. Meet product performance, reliability and cost targets to stay ahead of competitors in an industry that is experiencing rapid technological advances and massive cost reduction pressures, with hardware and software solutions from Mentor Graphics.



The flowchart outlined above illustrates the impact of thermal design and characterization on the supply chain for LED lighting applications within the automotive industry. Many variables go into producing the optimal end product. As a designer and integrator of LEDs, getting the best thermal performance at each step is critical to long-term product success.



"Thermal design represents 90% of today's design challenges for LED system manufacturers..."

Rudi Hechfellner
Philips Lumileds Lighting

With regulation driving the adoption of solid state lighting worldwide, LEDs are predicted to be used in 35-40% of brake and rear lights, with growth in forward lighting starting in 2013. In Europe, Daytime Running Lights (DRL) are mandated on all new vehicles after 2011.

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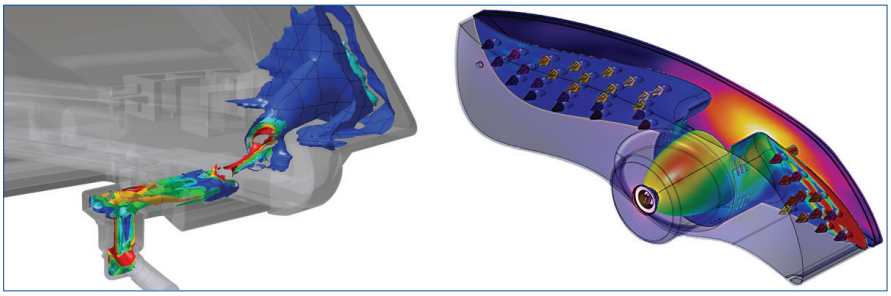

Hardware and Software Solutions for Automotive Lighting Applications

Mentor Graphics provides a unique set of tools for LED design, simulation and optimization. No other vendor offers this level of predictive capability to save time, cost and warranty issues.

FloEFD

Multi CAD-embedded CFD (Siemens NX™, CATIA V5®, Creo Parametric™ and SolidWorks®) and Inventor-integrated, with an electronics cooling module; FloEFD provides powerful thermal capabilities for analysis by specialists who support electronics cooling applications such as LED headlight design.

T3Ster & TERALED

T3Ster is designed with the needs of the LED manufacturing and automotive industries in mind. As an advanced thermal tester for thermal characterization, it can produce package thermal characteristics in just a few minutes. TERALED is CIE 127:2007 compliant, providing combined thermal and radiometric/photometric characterization of high-power LEDs, either in combination with T3Ster thermal transient tester to form a comprehensive LED testing station or as a stand-alone, automated optical testing solution.

FloTHERM

FloTHERM is the undisputed world leader for electronics thermal analysis. FloTHERM uses advanced CFD techniques and compact thermal models to predict airflow, temperature, and heat transfer for automotive lighting applications.

Solutions from Mentor Graphics Mechanical Analysis Division can assist with the following issues:

- Assure high color quality throughout the life of the LED
- Accurate, fast, thermal design of your lighting assemblies in familiar MCAD environment
- Assist in the selection of suitable LEDs from various vendors
- Guarantee high reliability with accelerated life testing
- Optimize manufacturing, reduce waste & warranty issues
- Assure hot lumen performance by design
- Choose thermal interface materials for maximum in-situ performance
- Structure Functions – Providing thermal 'X-rays' of first prototypes
- Achieve over 50 temperature and forward current measurements per hour

LED Light for you
powered by OSRAM

For the latest product information, call us or visit: www.mentor.com/mechanical

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