

Standardised LED light sources, a catalyst solution to accelerate mainstream adoption

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Today LED technology has made its inroad into all automotive lighting functions; featuring cars in which all conventional light bulbs have been ultimately replaced by LED. Historically, early adoption of LEDs started in the high end car market. Now we can see its usage expanding very rapidly into mainstream and lower end car models. However, addressing the majority market is stretching the requirements:

- decreased system design complexity
- faster roll out through increased engineering efficiency
- long term serviceability and supportability
- reduced logistic chain complexity
- lower warranty related risks and costs.

All those needs imply a decrease of system cost or even more, a reduction of total cost of ownership. For premium car models, LED peak designs are a result of fulfilling the highly customised specification requirements. For mainstream, a more modular and cost/performance balanced design approach needs to be considered to achieve economic feasible, still attractive system solutions. Translating the need of a modular design approach back to the LED light source, redefines its specification in a logical way to a standardised LED light source.

The standardized LED light source can eventually be a catalyst solution in driving LED adoption for the mainstream market segments by bringing following benefits in reducing the total cost of ownership:

- very simple and smart, consistent application interfaces over time
- higher engineering efficiency due to flexible re-usability
- known specification, reducing design complexity and development time
- easy repair and serviceability on light source level while reducing logistics complexity
- bringing a future proof component for a hassle-free long term supply to the market.

In the presentation, we will outline the state of the art in the technical development of this new category of standardized LED light sources for headlighting and signaling applications.

Key specification characteristics and definition of the standardised interfaces, with resulting engineering benefits:

- direct optical referencing, reducing tolerance stack
- consistent flux/light output, facilitating easier optical design
- well described thermal performance, simplifying heat management
- fixed mechanical footprint, ensuring full compatibility over time.

More cost effective engineering can be achieved by re-use of the same LED light source over and over again on different lamp designs, applying well-known design rules with predicatable behavior.

The product design will bring standardized LED light source handling to a well-known 'bulb like' robustness. The 'plug and play' type of solution enables very simple assembly processes across different factory locations, increasing production yield.

Future proof standardized LED light source solutions will offer long term supply supportability and serviceability:

- lowering risk through multi-sourcing
- avoiding re-design, re-testing and re-homologation
- enabling option for easy serviceability on light source level
- simplifying logistics management by reduced supply chain complexity, number of spare parts, stock level and related costs.

Finally, the status of related standardisation roadmap activities and an outlook on the regulation timeline will be reported.