

Abstract

The latest trends display a growing range of applications for LEDs. The development of this light source is in its early stages and its domain in the future is hard to predict. This report will analyse the potential for development of high performance LEDs used for automobile head lights. The first chapter provides technical light parameters for today's high performance LEDs. Furthermore it looks at the development potentials of white LEDs, based on creation of white light with semiconductor diodes and compares them with conventional light sources such as incandescent and gas discharge lamps.

The second chapter focuses on fast circuit time as a unique feature of LEDs. It describes a variant LED head light which enables free allocation of light beams by combining a pulsed light source with a dynamic optic. In order to discuss future production this principal will be analyzed and implemented on the basis of a functional model.

In order to guarantee sufficient use of pulsed LEDs for automobiles, it was necessary to examine technical and physical characteristics of LEDs. As a result it was found that the glare of pulsed light sources doesn't cause visual curtailing. In addition, the phenomenon of "flickering rearlamp" will be investigated to conclude guidelines for a construction that prevents that disadvantage regarding LED temperature and light efficiency will be analyzed. By calculating thermo dynamical capacities and resistance, the observation resulted in a minimum frequency for semiconductor diodes. LEDs below that value should be operated only with lower power.

Through spectral and transient measurements of the optical step response, the influence of phosphor conversion on circuit times of white LEDs were analyzed. The result is a delay of about one micro second.