Abstract

In the commercial vehicle sector electric trucks powered by high-voltage batteries are gaining place. In addition, various levels of driver assistance functions and self-driving function are being implemented in trucks step by step.

In both cases, power redundancy is needed to operate critical vehicle control functions in case the primary battery fails. Such safety-critical functions include steering system operation and brake system operation.

This is provided by a built-in safety battery, which is connected to the vehicle's power line via a switch when it is needed. To allow this battery to fit into a small space and draw high currents, the concept incorporates a lithium-titanium oxide battery.

The lithium-titanium oxide cells need to be monitored and balanced to ensure that they do not enter either into under voltage or into over voltage range

Balancing improves the utilization level of the cells, thus more energy can be extracted, which increases the operating time.

In my thesis next to discussing the properties of batteries, I will also describe the advantages and disadvantages of lead-acid cells used in the automotive industry and the lithium-titanium oxide cells used in this project.

In carrying out the set task, I implemented the block diagram of the battery monitoring system, built the circuit diagram using component values, which were selected according to simulation results, and designed the printed circuit board for the system.