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Design and Functional Verification of a Safety Mechanism for the Use in a Fault-Tolerant Power Supply System.

ABSTRACT - Masterthesis

Driver assistance functions in modern vehicles, such as distance control, lane departure warning or emergency brake assistance, support the driver in vehicle guidance and contribute to an increase in safety and comfort when driving. In the future, fully autonomous vehicles will even enable the driver to completely suspend driving for longer periods of time and dedicate his attention to other menial tasks.

The development and onset of intelligent assistant systems requires the simultaneous development of fault-tolerant on-board power supplies in order to fulfill functional safety requirements. One such safety system is implemented to the on-board power supply, to ensure a high reliability and safety to guarantee the supply of the safety relevant functions and systems, e.g. electrical power steering or monitoring of the driving environment. Malfunctions of these safety relevant functions due to an on-board power supply blackout must be avoided. In this work, a first order safety mechanism is to be set up and tested. It detects inadmissible states (here: Overcurrent and Undervoltage states) and consequently triggers a safety disconnector.

Special attention is paid to the reaction time in the range of microseconds. First, possible hardware circuits and filters are to be analysed and then tested on a test bench. Tests have to be carried out using an existing Microcontroller evaluation board.