

Bachelor/Masters Thesis

Development and Setup of a Low Voltage Active Rectifier for a ETIT Demonstrator



TECHNISCHE
UNIVERSITÄT
DARMSTADT



Dr.-Ing. Michael Wolff · S3 | 21/205

michael.wolff@lea.tu-darmstadt.de

Background:

Modern power grids feature an increasing number of volatile power generation (PV, Wind). Therefore, the capabilities to store electrical energy becomes ever more important. To give students the possibility to experience this challenge first hand, a demonstrator of a small, electrically fully functional, modular 12 V DC distribution grid, including generation, storage and consumption is developed at the institute.

Goal (Bachelor Thesis):

The goal of this thesis is the development, setup and testing of a three-phase rectifier including active switching devices. To achieve this, the diodes of a B6 passive rectifier will be replaced by MOSFETS, with their switching signal mimicking the diodes behaviour.

Tasks (Bachelor Thesis):

1. Research of relevant topics, amongst others: Three phase Rectifier, MOSFETS, Gate Driver, PWM generation ...
2. PLECS Simulation of the active rectifier
3. Component Selection and Schematic design
4. PCB design
5. Assembly and verification of proper function
6. Documentation

Enhancement for Master Thesis:

Additional Tasks, as well as the scientific goals for a Master Thesis will be discussed individually based on the students personal interest, background of study and its applicability to the project.

Working Language: German, English

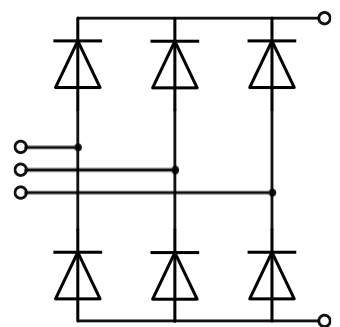


Fig. 1: B6 Rectifier

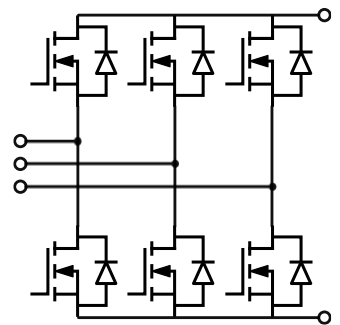


Fig. 2: B6 Topology with
MOSFETS