

Master 2016

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Analysis, Evaluation and Design of Cascade DC/DC Converter Operating in Wide Input Voltage Used in Industrial Analog Magnetic Encoder Dual-Internal Power Supply.

ABSTRACT - Masterthesis

The main objective of the thesis is to analyze, evaluate and design a cascaded DC/DC converters operating in wide input voltage for an industrial analog magnetic encoder. The evaluation method combined study of Switch mode DC/DC converter topologies, feedback control techniques and market research on DC/DC converters to select the cascaded DC/DC converters for the industrial magnetic encoder design. The evaluation improved the electrical design using TINA TI simulation software, measuring V / I , max load, voltage ripple and switching frequency. The research included hardware measurements for analysis and testing using evaluation boards for current consumption, Inrush current, boot-up behavior, output voltage ripple, switching frequency using measurement equipment which included digital storage oscilloscope, and supporting test equipment, such as power supplies, DMM and electronic loads. Investigated and qualified the DC/DC converters, inductors and capacitors for space optimization, voltage ripple, inductivity effect in the magnetic fields, and temperature drift measurements in a climate chamber from -40°C to $+85^{\circ}\text{C}$. Evaluated and tested the industrial magnetic encoder prototype with hardware measurements and achieved the desired results.