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Proposals For University Thesis

from STMicroelectronics
ADG LGS VIPower&BCD R&D

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Macro Item List

1 Analog to Digital Converter

2 Functional Safety Mechanisms

3 Current Sense

Analog to Digital Converter

Analog to Digital Converter (ADC)

- In-depth Study of the possible topologies:
 - Flash ADC, ADC SAR, ADC Sigma-Delta, other possible solutions?
- Theoretical base for ADC Sigma Delta dimensioning vs characteristics of the signal to be converted
- Accuracy: in-depth study of the possible techniques to enhance conversion accuracy vs temperature and voltage / current level
 - Advanced analog and digital techniques for Gain and Offset compensation
- Sample Rate: in-depth study of the possible techniques to increase the conversion rate
- Shared ADC: architecture using only one fast ADC with multiplexed inputs having different priority levels
 - Exploration of possible priority management techniques
 - Exploration of possible techniques to maximize conversion speed in this context



Functional Safety Mechanisms

Functional Safety Mechanisms

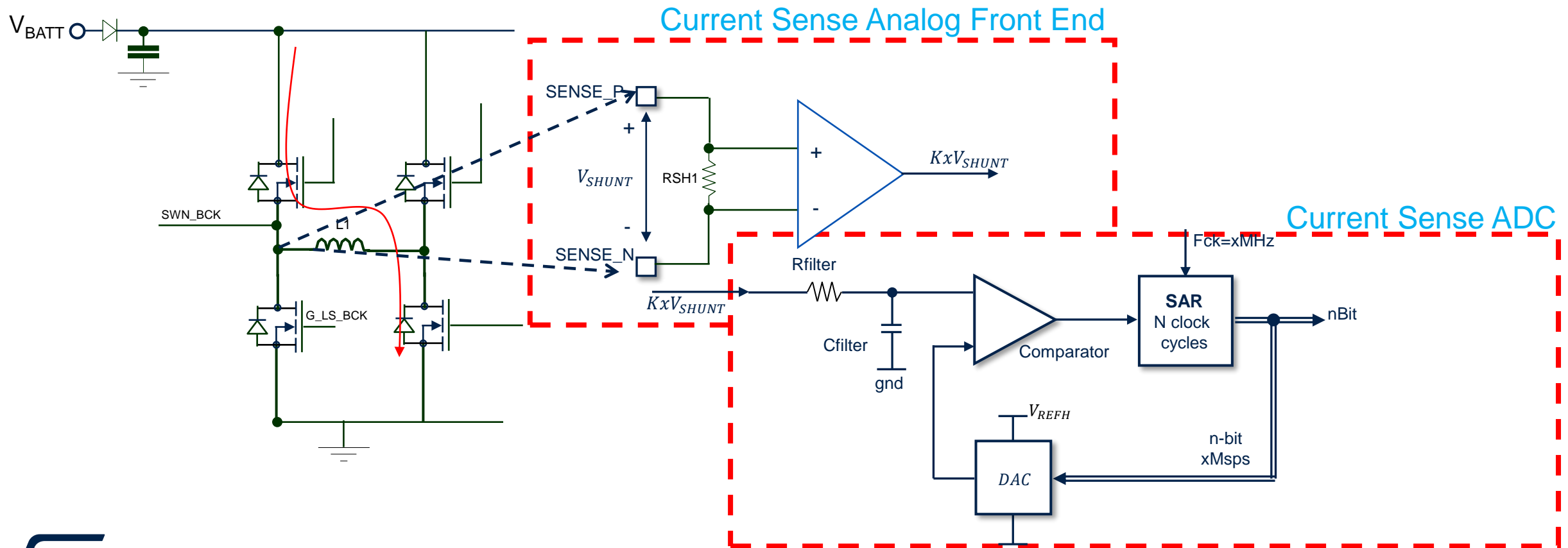
(standard ISO 26262)

- Analysis of possible advanced Safety Mechanisms, to monitor, notify or even automatically react on possible faults on the safety path
 - Clock monitoring and recovery
 - Data transfer consistency through a communication interface and between different subsystems
 - ADC Self Test: comparison between different techniques in terms of coverage, cost, complexity
 - Specific subsystem Self Tests
 - Power Stage Stuck On, Stuck Off
 - Current Sense Self Test
 - Etc.

Current Sense

Current Sense

- All DC-DC converters, whatever the used topology, need a current sense.
- The current sense could be an interesting block to explore in terms of topology, speed, accuracy



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