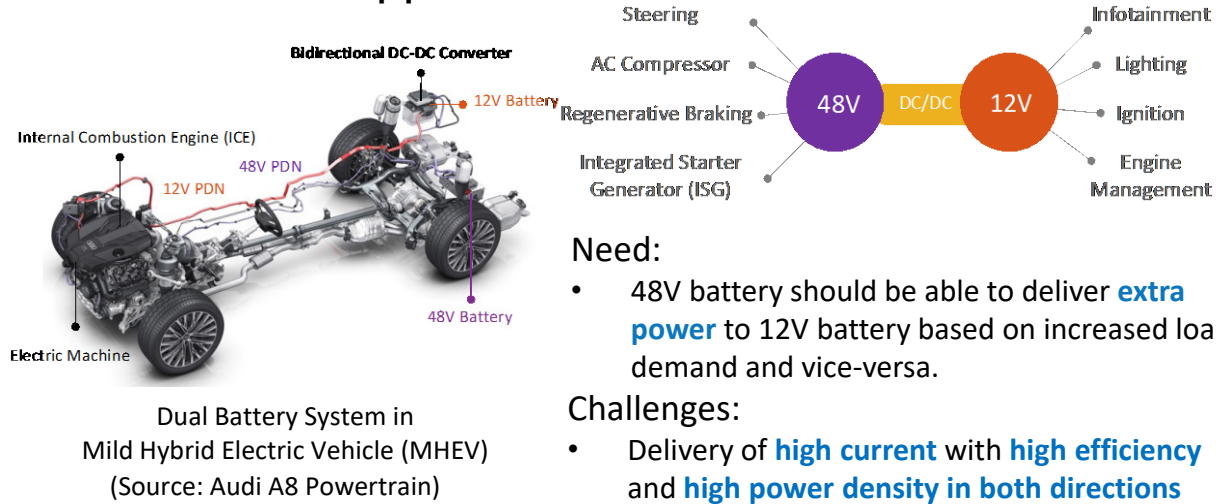


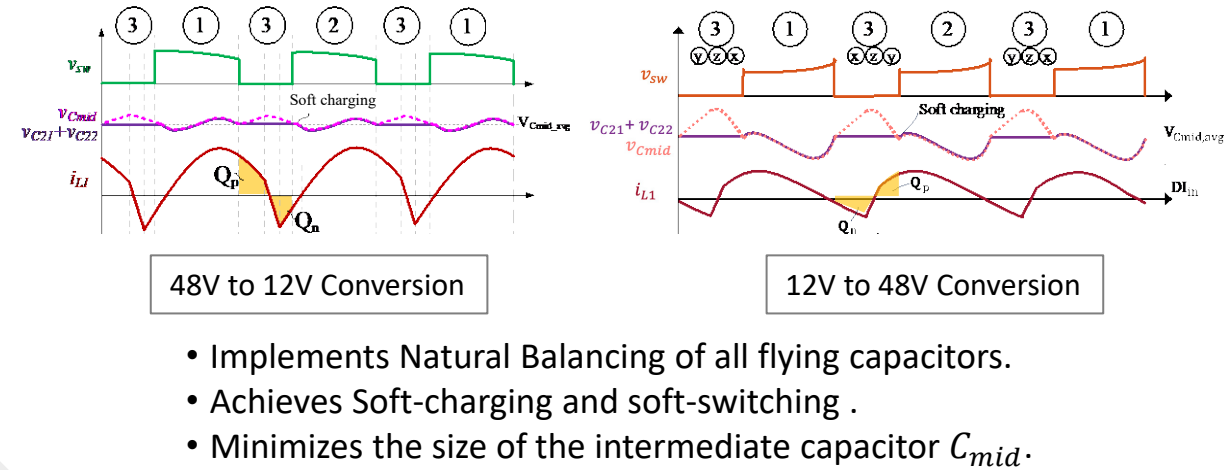
Bidirectional Power Transfer in Hybrid Switched-Capacitor Converter for 48V/12V Regulated Automotive Applications



Motivation and Application

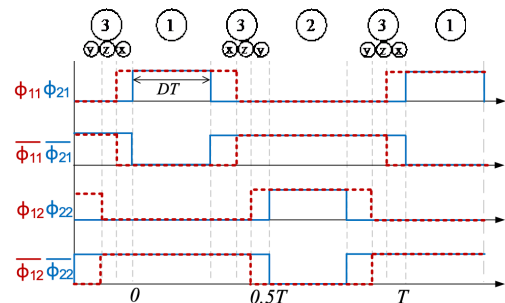
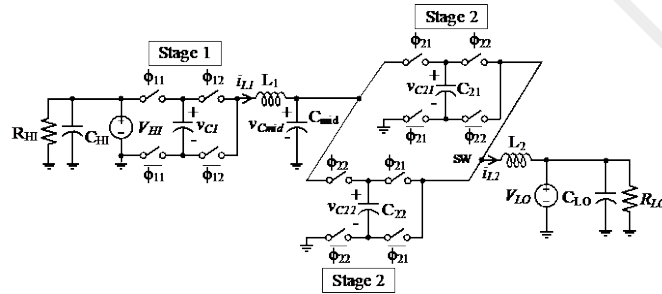


Advantages of Proposed Control Technique



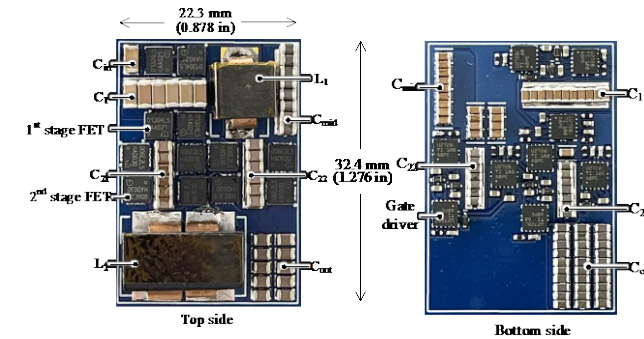
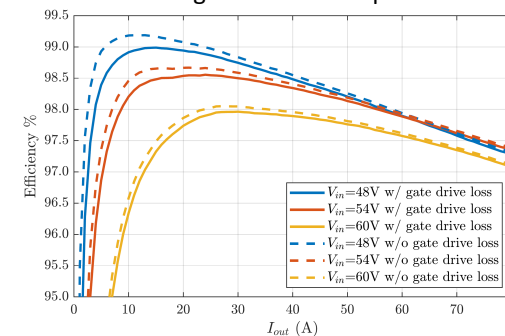
Converter Topology

- 48V-to-12V **regulated** cascaded hybrid resonant-PWM converter [1]
- 1st stage uses a conventional doubler in resonant mode
- 2nd stage used two interleaved doublers operating in PWM mode.



Hardware Demonstration and Results

- Measured Efficiency at:
- Input voltage: 48 – 60V
 - 80 A full-load current
 - Regulated 12 V output



- 80A, 99% peak eff. 3115 W/in³ power density
- 21% loss and 63% size reduction over SOTA

[1] T. Ge, et. al., "A Regulated Cascaded Hybrid Switched-Capacitor Converter with Soft-Charging and Zero Voltage Switching for 48-to-12-V," 2023 IEEE APEC.

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