vitesco
TECHNOLOGIES

COS PROOF

February, 4th 2021

Third Party

MOTIVATION

- To fulfil upcoming environmental standards in terms of pollutant emission, Automotive market is going towards Electrification.
  - ➔ As consequence, vehicles become more and more hybrid or full electric.
- In any case, the use of electric motor is mandatory, whatever its power.
- Electronics to control these motors is moving to power electronics with current from few tens A to few hundreds A and voltages from 600V till 1200V. Electrical automotive requirements for power systems increase efficiency management in power loss during energy transfers.
- To optimize efficiency of the power electronics, new technologies like Wide Bandgap technology are foreseen.

Figure 16: Vitesco applications: a) HV motor and inverter system, b) DCDC 4kW, c) charger 400V to 12V.

MOTIVATION

WBG MosFet

- Enables higher switching frequency
- Enables higher switching slew rate
- Smaller active area @same performance
- Higher Tj,max

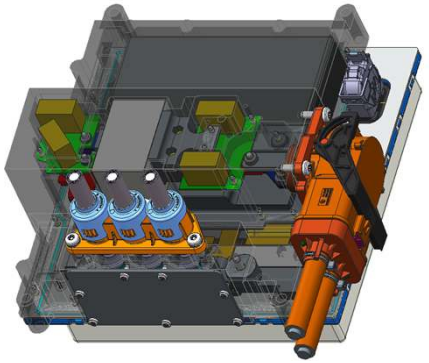
Product

- Lower switching losses
- Lower conduction losses @partial load

- Efficiency increase
- Enables smaller power module
- Size reduction of
  - inverter cooler
  - motor cooler
  - Passive components

System

- Battery cost reduction
- System cost reduction
- Increased power density
- Total weight reduction
- Expected for high power/ high voltage systems
- Enables smaller vehicle cooler



WBG INTRODUCTION

OPEN QUESTIONS

- ❑ Datasheet maturity
- ❑ Technology maturity
- ❑ Component behavior at extreme temperature, in switching mode, at high frequency, …
- ❑ Conduction and switching losses variations across all conditions
- ❑ Reliability, failure modes & Qualification standards for automotive

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LET'S DISCUSS