

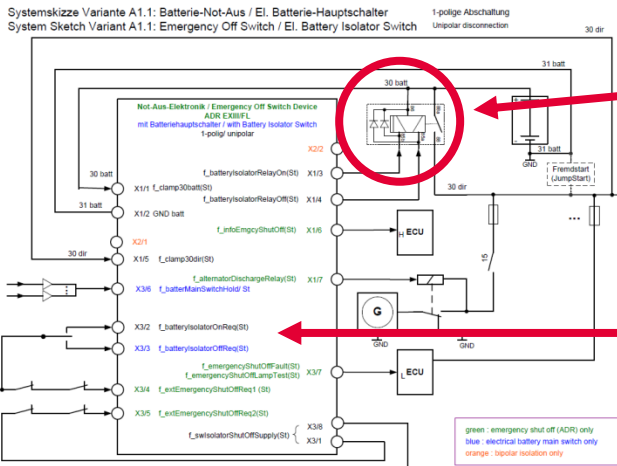
Battery Switch  
for all voltage  
classes up to 48V

electronica 2018

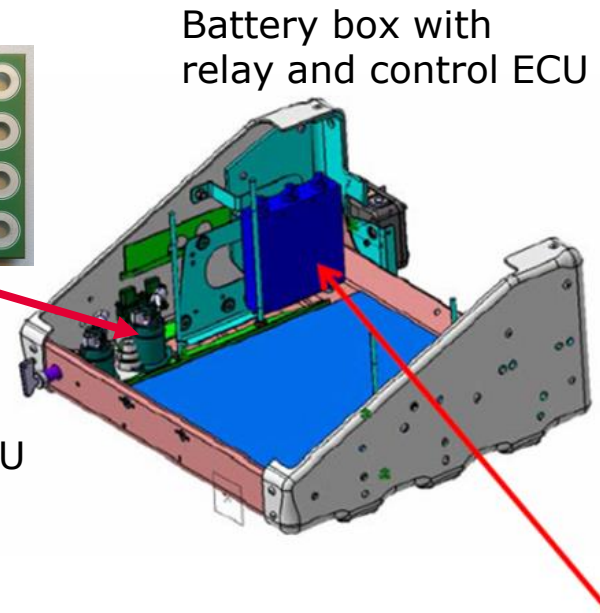


# Basic concept for the demonstrator

- › Replace only the be-stable power relay with a "bi-stable" semiconductor power switch board
- › Re-use the existing control logic and control ECU unchanged
- › Use a small signal be-stable relay to control the semiconductor switch with the existing control ECU
- › Easy mechanical integration into the existing battery box should be possible
- › No change of the vehicle software necessary
- › Overall identical ADR functionality, same behavior, no limitations



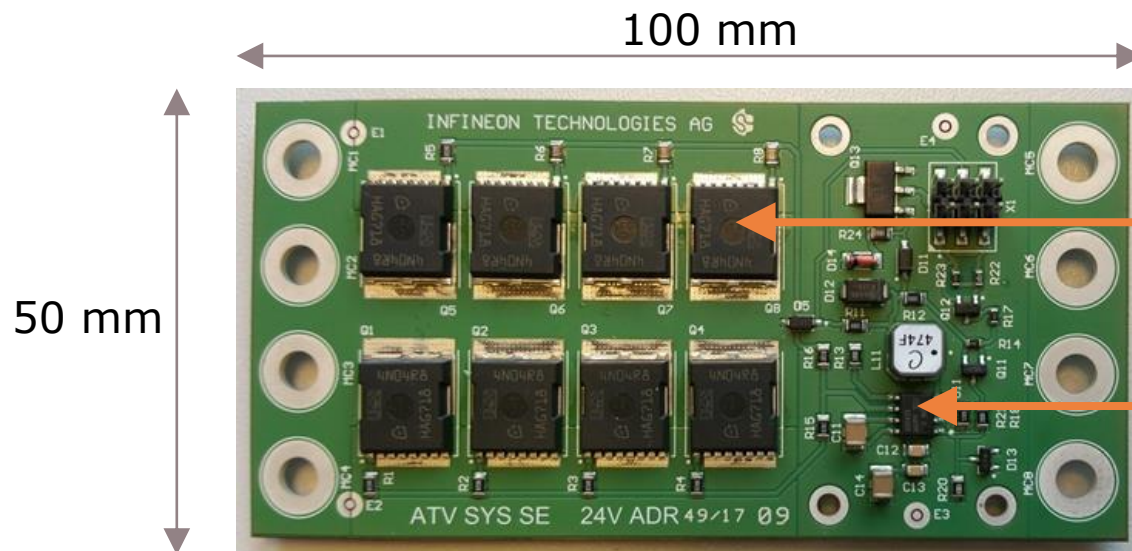
Semiconductor "relay"



Battery box with relay and control ECU

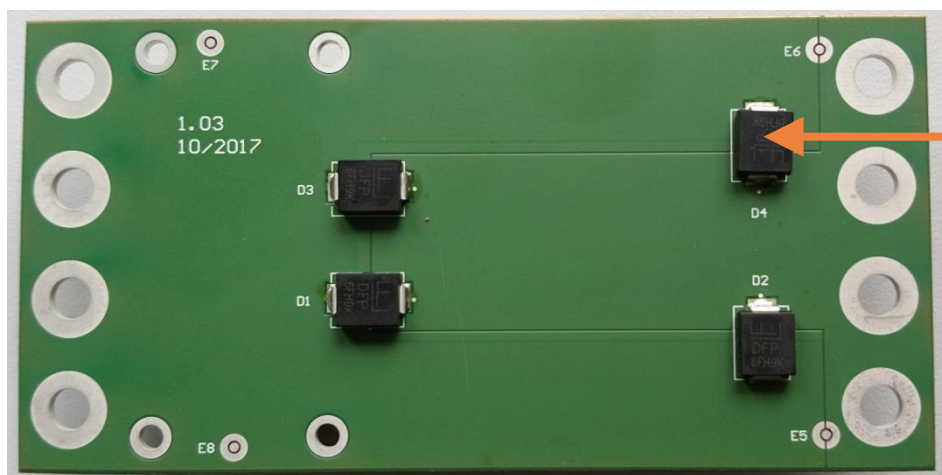
Control ECU

# Overview



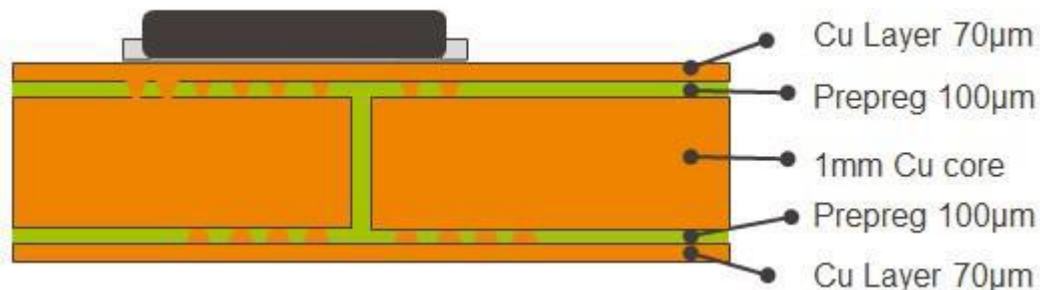
8 x IPLU300N04S4-R8  
 40 V  
 0.53 mΩ typ  
 300 A

AUIR 3242S  
 normally on  
 low quiescent current



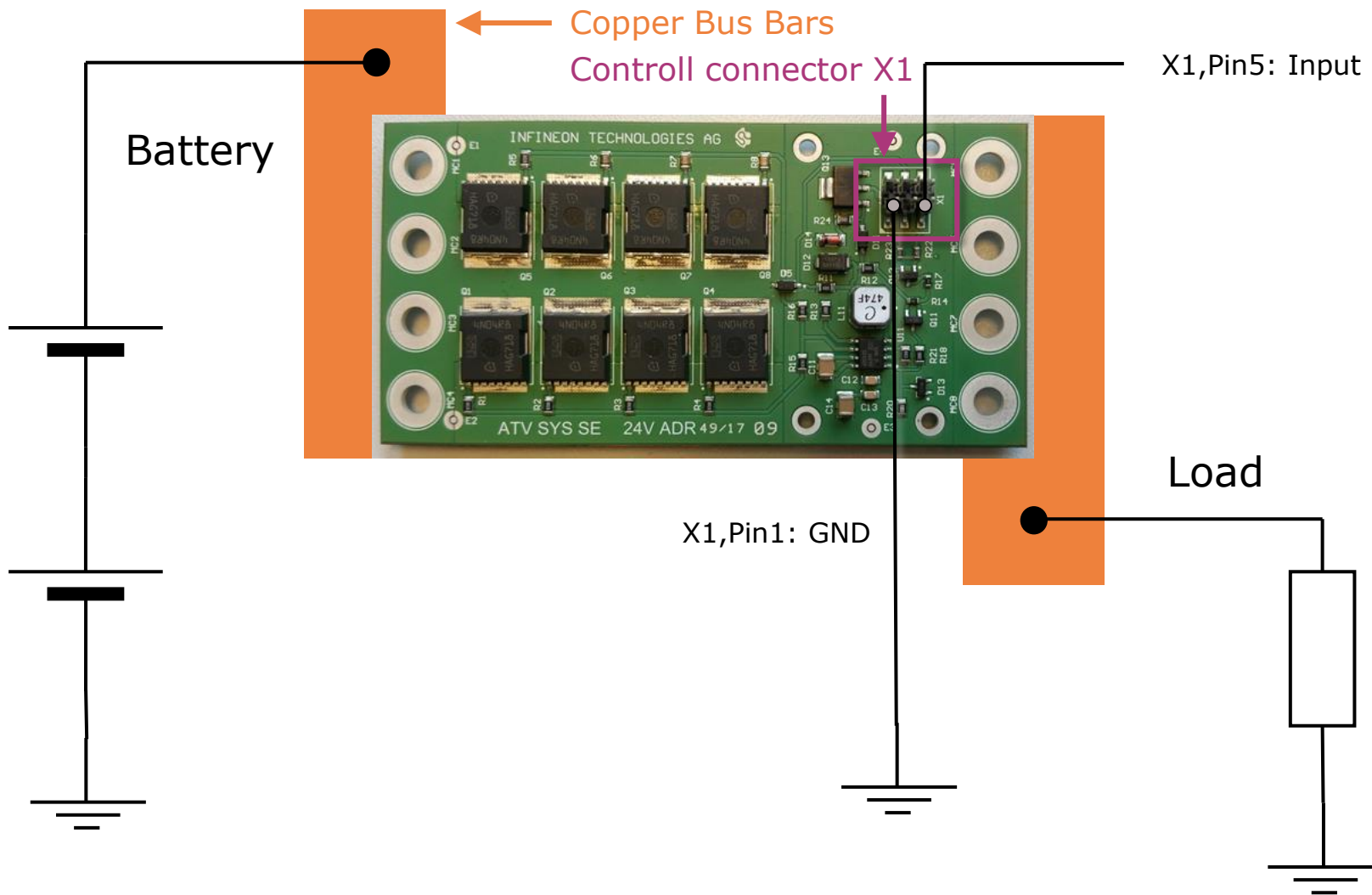
4 x SMDJ33A  
 TVS Diode

# PCB technology

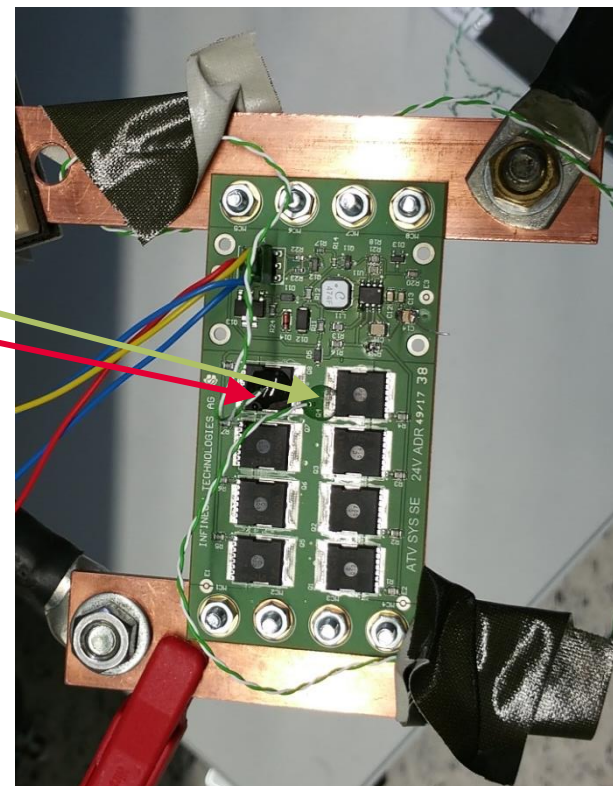
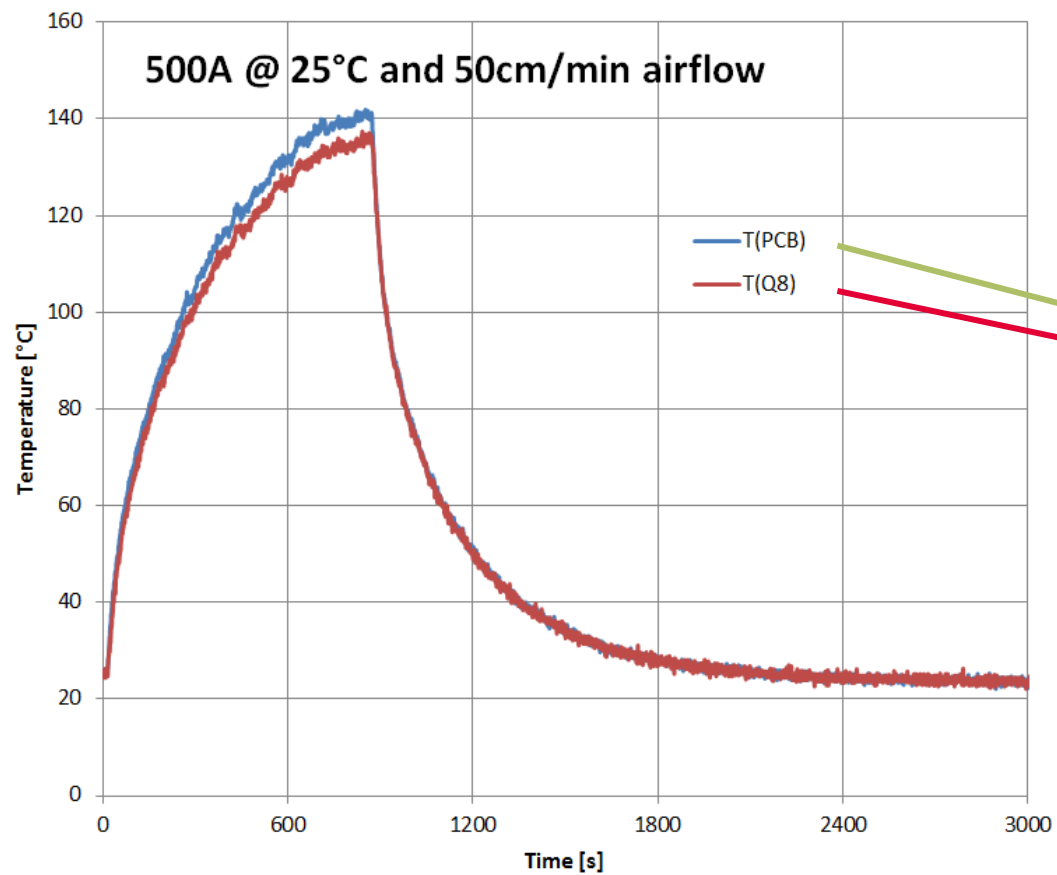


Feature	Value
Size	100.0 mm x 50.0 mm
Thickness	1,3 mm
Electrical resistance	60 µΩ
Thermal resistance (non-isolated version)	0.1 K/W
Thermal resistance (isolated version)	~ 0.2 K/W
No. of copper-filled laser vias per MOSFET	300

# Connecting the switch



# Thermal behaviour



# Current rating

Current	Power Dissipation	Duration
300 A	~ 15 W	Continuous
500 A	~ 40 W	~ 10 min.
700 A	~ 80 W	~ 5 min.
1500 A	~ 360 W	~ 15 s
1800 A	~ 520 W	~ 10 s

Values estimated for board exposed to light air flow of 50 cm / min. and a start temperature of 25 °C



# Megatrends of CAV market: Similar to passenger car

## Megatrends for commercial vehicles



### FUEL EFFICIENCY

- > Enhanced energy recuperation
- > Electrification of side loads and powertrain

Powerful energy storage



### SAFETY & ADAS

- > Enhanced emergency braking
- > Enhanced highway pilot
- > V2V – platooning
- > Remote control maneuver

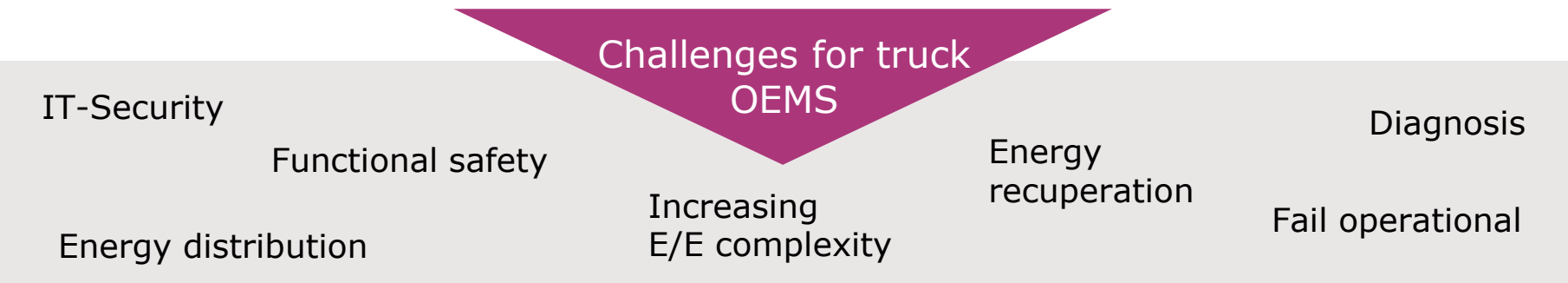
Sensor Fusion  
System Redundancy



### CONNECTIVITY

- > Networked information, Navigation info's
- > Vehicle to infrastructure connectivity

Increased data output & secure data- and energy supply



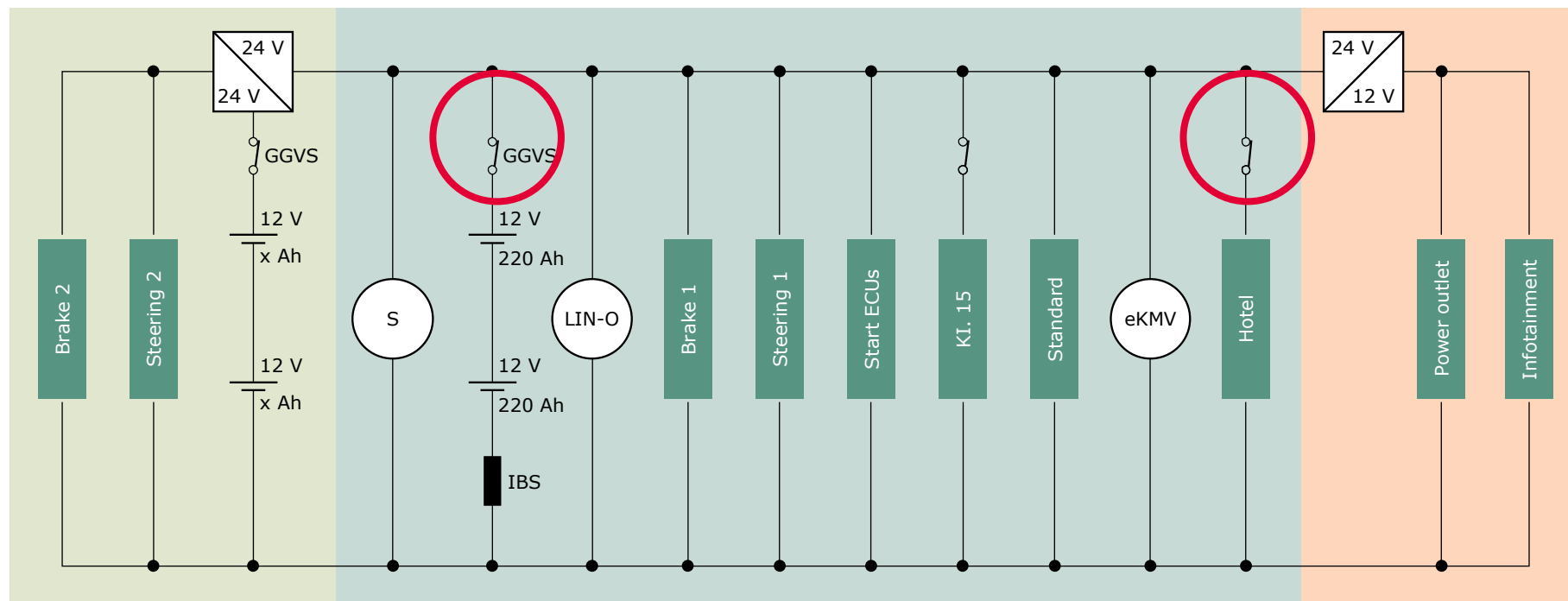


# Example of power architecture: Implementation of megatrends in E/E-architecture of commercial vehicles

## Redundant 24 V powernet

## Main 24 V powernet

## Cabin powernet





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