

Electronic Fuses

Reliability technology ensures a safe ride - every time!

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EXPERTS FOR AUTOMOTIVE ICs

We have a broad expertise in analog mixed-signal integrated circuit design.

We deeply understand our customers application needs to create real system innovation.

We are a global player for automotive ASSPs and ASICs. We offer worldwide sales and application support.



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CORPORATE KEY FACTS

~7 Elmos ICs

on average in every new car

6 product segments

Motor Control, Lighting, Safety/Power/Custom ICs,
Ranging, Optical, Sensor ICs

15 locations worldwide

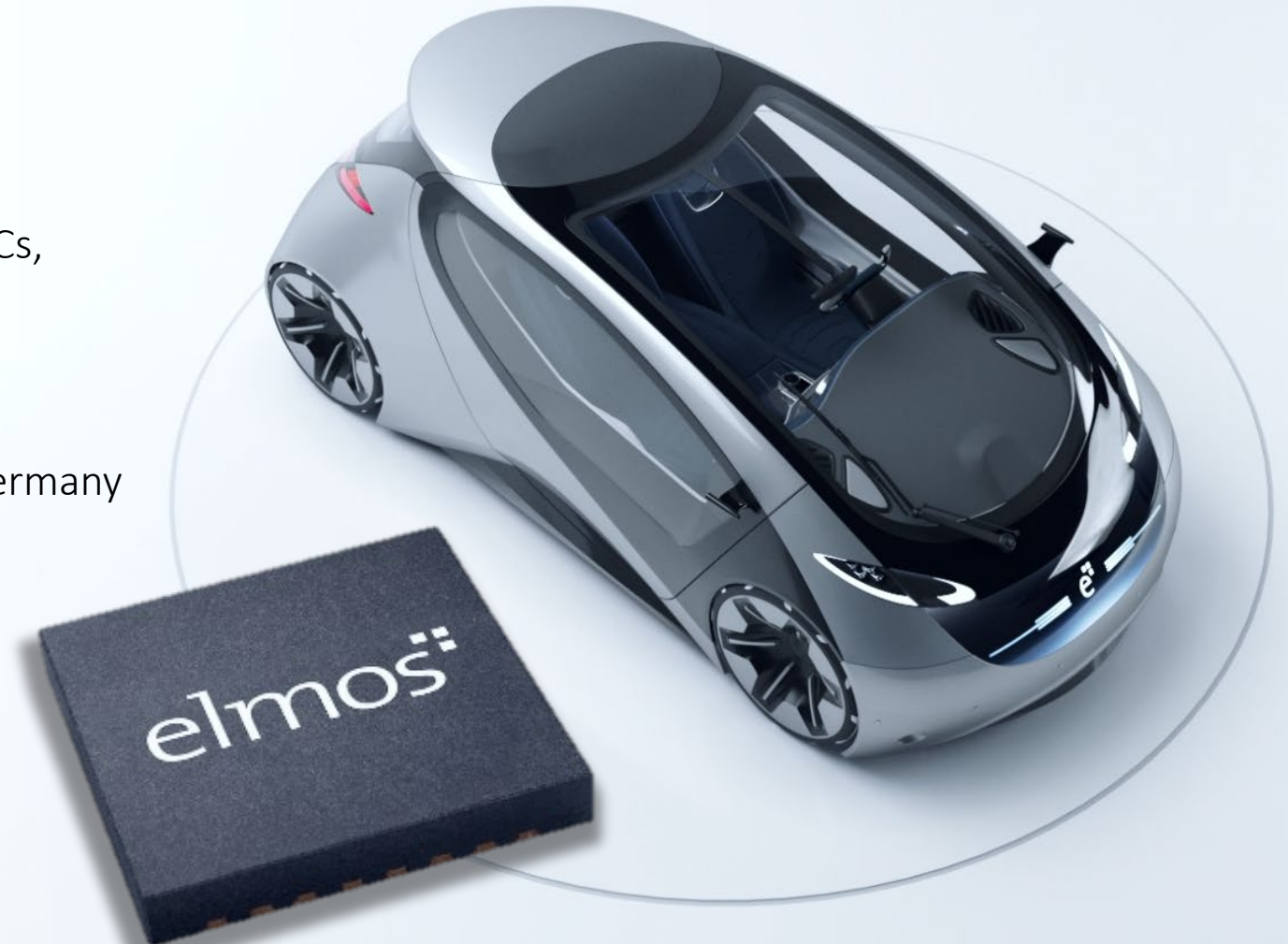
incl. 6 R&D centers, HQ located in Dortmund, Germany

~40 years of experience

in analog mixed signal IC solutions

1,200 employees

thereof 350+ product developers & engineers

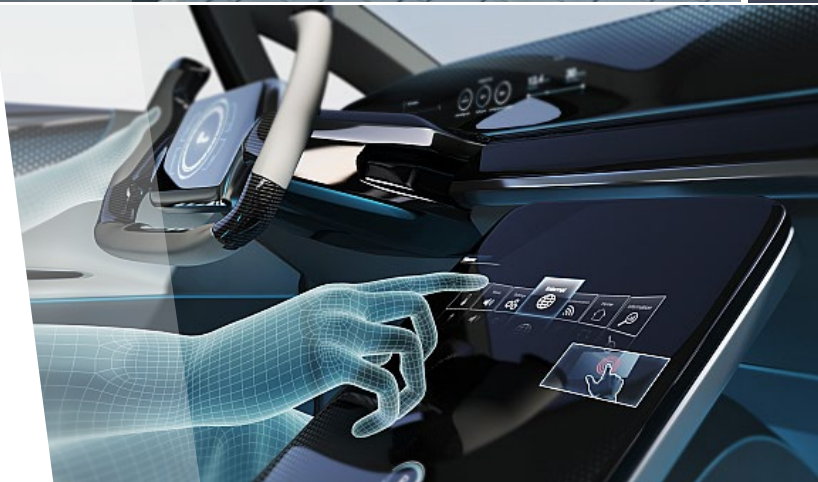
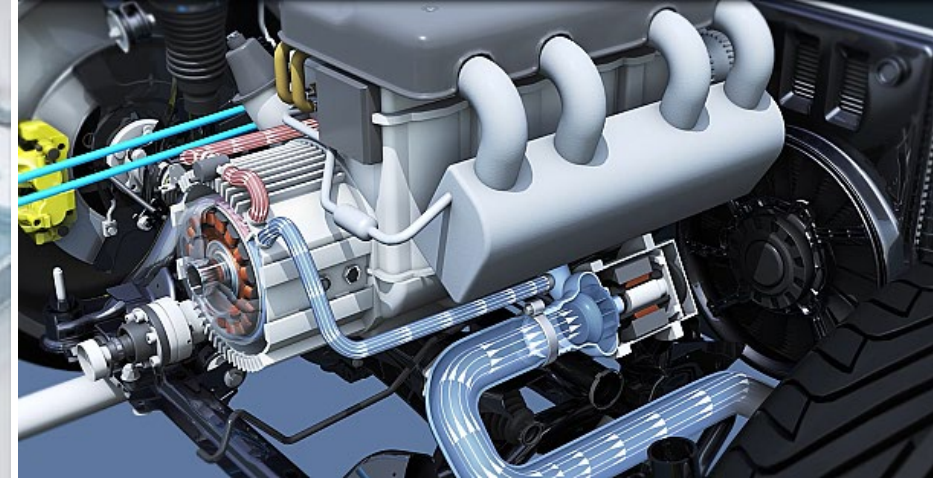


WE ARE LOCATED ALL OVER THE WORLD



PRODUCT SEGMENTS

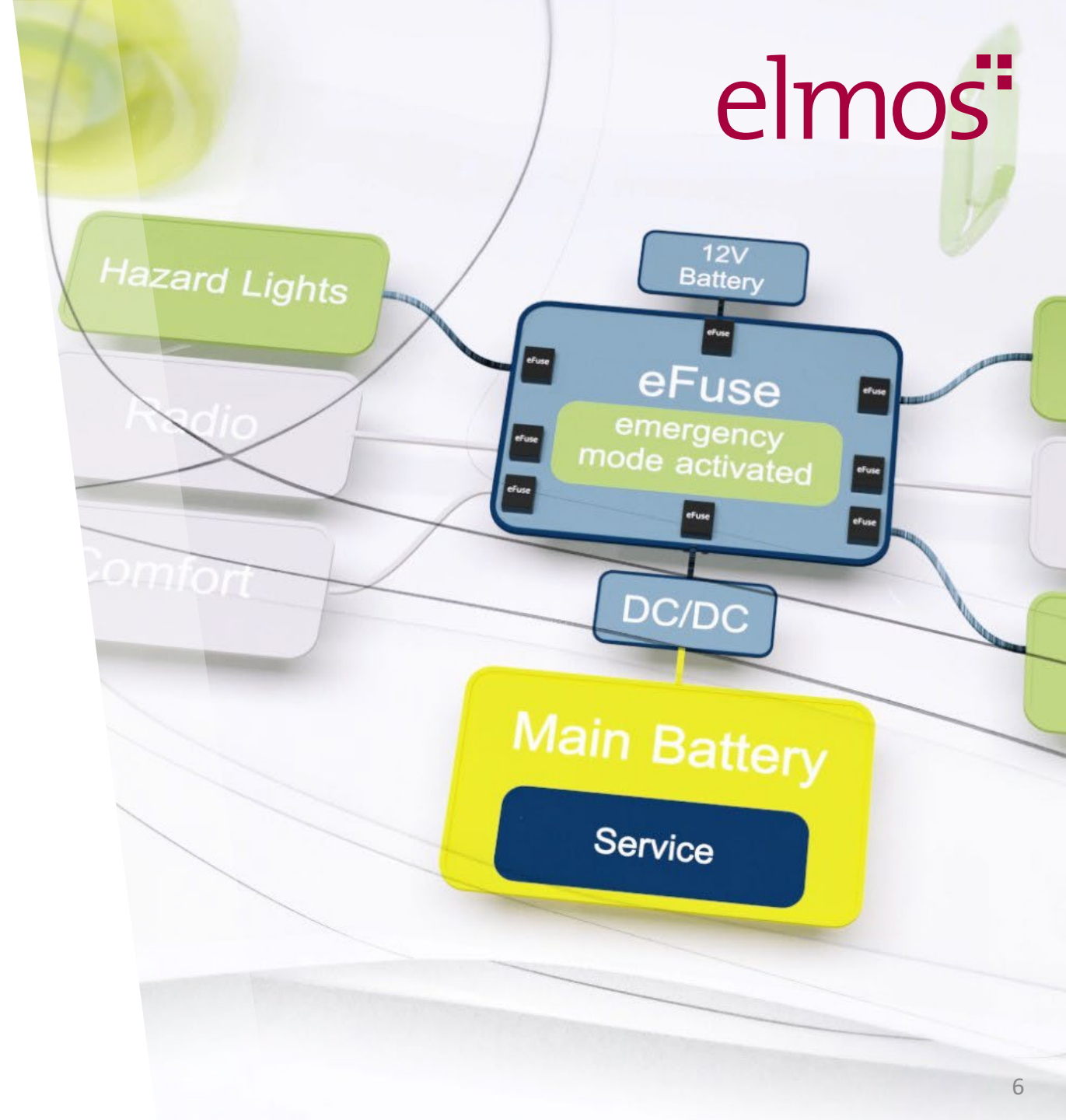
- RANGING
- OPTICAL
- SENSOR ICs
- MOTOR CONTROL
- LIGHTING
- SAFETY, POWER & CUSTOM ICs



ELECTRONIC FUSE CONTROLLER

Technical benefits of electronic fuses

- Permanent Measurement of
 - Current
 - Voltage
 - Temperature
- Reduce wire harness weight
- More trustable sensor integration due to less voltage drop and less sub-net interference in vehicle power network
- Power monitoring and diagnostics all over the vehicle smart power network (e.g., direct diagnostics or plausibility check possible)
- Smart power distribution with advanced function



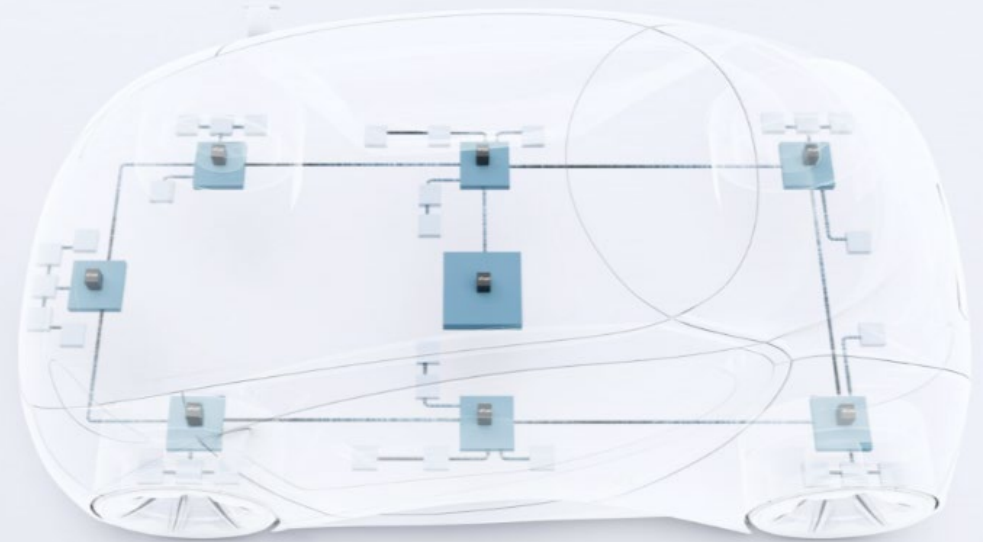
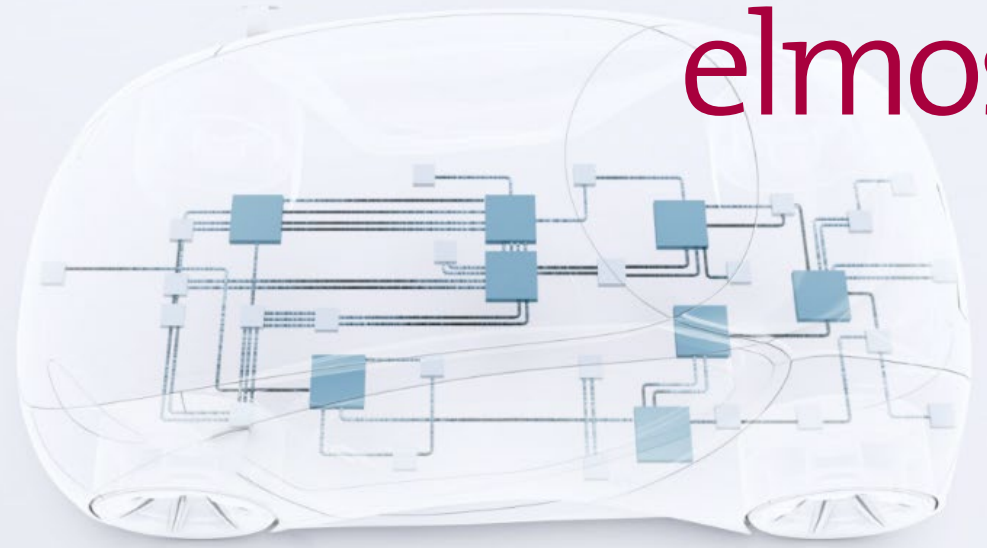
VEHICLE WEIGHT REDUCTION

Accurate current / power measurement allows reduced wire harness

The Elmos solution emulates the dynamic “melting fuse” characteristic but adaptive, faster and more precise

- Less wire diameter and wire harness weight
- Cost savings
- Configurable fast protection for improved wire protection
- Lower tolerances due to calibrated measuring unit
- Prepared for „Power Network Segmentation“

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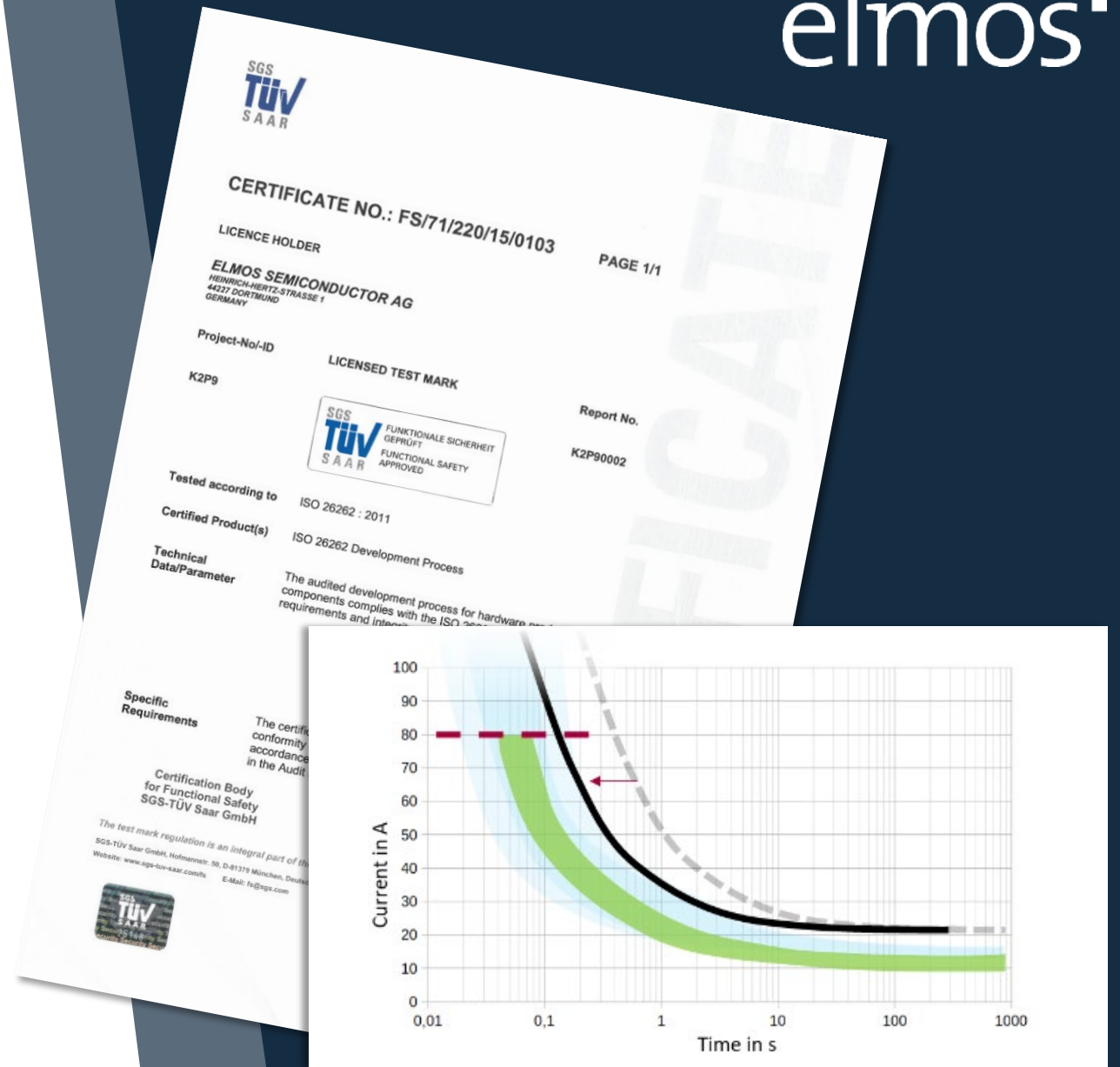


FUNCTIONAL SAFETY

ISO 26262 certified processes at Elmos

Global safety benefits compared to a melting fuse

- Individual remote channel switching
- Automatic recovery with limited number of retries
- Predicted maintenance
- Diagnosis feedback
- IC fulfils technical safety requirements with ASIL B
➔ enables to improve system reliability up to ASIL D



ARCHITECTURE FLEXIBILITY

Electronic Fuses to enable flexible power E/E architecture

Advantages

- Reduced junction box construction
- Freedom of mounting position
- Optional decentral fuses
- Zone controlled power subnets
- Reduced central power lines



ACTIVE POWER MANAGEMENT

Benefit from several operating modes for many use cases

Smart Energy Management for

- Autonomous local fuse functionality

Elmos solution allows individual remote channel switching

- Adaptive wire harness protection
 - ➔ In-rush current management by adaptive shutdown threshold
- Reduces sleep current in high voltage domains

Zone controller can be remotely configured for:

- Different platforms
- Different vehicle configurations
- Remote re-cover / re-activation



BETTER SYSTEM RELIABILITY

Limit voltage drop on supply network

Avoid instable bus communication, unreliable sensor data and unwanted resets by using eFuses

- Reduced failure cross coupling to other power segments by fast over current shutdown → Fast reaction time
- Smart system recovery by individual segment control → Adaptive over current threshold
- Independent channel switching

Enhanced system reliability by fast & precise shutdown of faulty segments

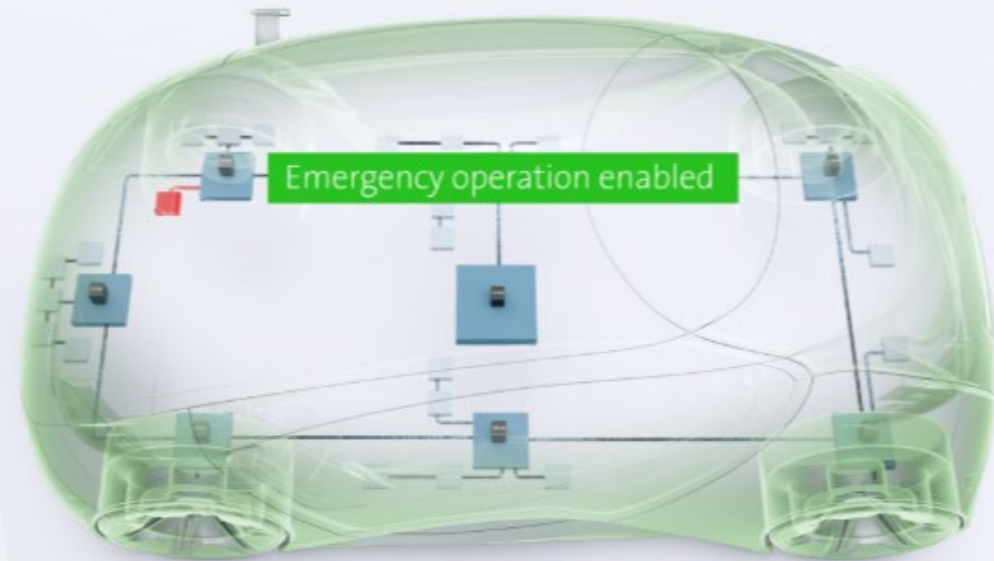
- Act autonomously by GET → CHECK → ACT & COMMUNICATE
 - with local current, temperature and voltage

Enables to reach safe state of the vehicle @any-time!

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Modules update separately



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Innovation Matters

DISCLAIMER

This presentation contains forward-looking statements based on beliefs of Elmos' management. Such statements reflect the company's current views with respect to future events and are subject to risks and uncertainties. Many factors could cause the actual results to be materially different, including, among others, changes in general economic and business conditions, changes in currency exchange rates and interest rates, introduction of competing products, lack of acceptance of new products or services and changes in business strategy. Actual results may vary materially from those projected here. Elmos does not intend or assume any obligation to update these forward-looking statements.



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