



CASE STUDY



Arm-Powered eFuses from Elmos, the Smart Guardian of the Vehicle



- + Elmos is a Germany-based manufacturer that develops, produces, and sells semiconductor products primarily for use in automotive applications. For the past 30 years, Elmos innovations have enabled new functions in vehicles and made mobility safer, more comfortable, and more energy efficient.
- + www.elmos.com



A New Generation of Advanced Vehicle Power Management

Many functions in today's automotive vehicles are already electrified, with more still to come. However, the traditional fuses in these vehicles – which save and protect the automotive system from malfunctions – are often slow and imprecise in reaction time and because they melt sacrificially to protect the circuit they can only be used for one-time protection.

This needs to change with the introduction of the new electrical/electronic (E/E) architectures for automotive manufacturers because these older fuses are not appropriate for new in-vehicle compute solutions and the wider technological transformation happening in the automotive industry in general.



Smart Electronic Fuses

Permanent Measurement of

- Current
- Voltage
- Temperature

Next-generation vehicles need smart power distribution with an integrated reliable fuse function that has faster reaction times, flexible software-controlled algorithms, and software configuration abilities.

New smart electronic fuses, known as eFuses, are an innovative concept that not only replace the old melting fuses but create a whole new set of opportunities for an evolutionary step into real smart power distribution. This enables critical systems to remain controllable during malfunction or in an emergency, where existing melting fuses would have simply switched off the complete system.

eFuses for a New Era of Vehicles - Smart Power Distribution

eFuses are the solution for modern, intelligent compute architectures in the new era of automotive vehicles. They deliver:

- Advanced & reliable safety
- Functional safety
- Architecture flexibility
- Active power management
- Enhanced system reliability

Smart Electronic Fuses

Smart Energy Management for

- Autonomous local fuse functionality
- Active diagnosis by permanent monitoring
- Switchable by communicated commands

In response to this technology shift, Elmos is creating a brand-new family of eFuses with integrated microcontrollers for automotive applications that are all built on Arm's Cortex-M23 CPU.

Elmos Automotive Solutions Powered by Arm

The Elmos safe, secure eFuse provides a solution for precise power control. It achieves this by incorporating leading-edge integrated analogue gate drivers with sense technology and a highly efficient safety enabled microcontroller. Together with the external generic MOSFET's, this enables the eFuse user to take advantage of a simple and standardized software architecture to configure and control flexible and innovative design concepts. The availability of a range of safety-enabled compiler tools and software further assists the integrators' use of these eFuses and helps to speed their rapid deployment in future vehicles that have intelligent compute and power E/E architectures.

By using smart energy management and smart power distribution features, eFuses can deliver:

- Advanced safety
 - For active diagnoses and switchable zones to support safety-critical scenarios, including emergency energy supply for safety steering modes.
- Adaptability and flexibility
 - With autonomous local fuse functionality, active diagnoses through permanent monitoring.
 - The ability to switch based on the different communicated commands of upper system layers.

Useful Links

– Elmos eFuse <https://www.elmos.com/automotive-efuse>

– Arm Microcontrollers for Automotive

<https://www.arm.com/campaigns/automotive-microcontroller>

– Arm Cortex-M23

<https://www.arm.com/products/silicon-ip-cpu/cortex-m/cortex-m23>

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