

S32E2 REAL-TIME PROCESSORS FOR ELECTRIC VEHICLE CONTROL AND SMART ACTUATION

OVERVIEW

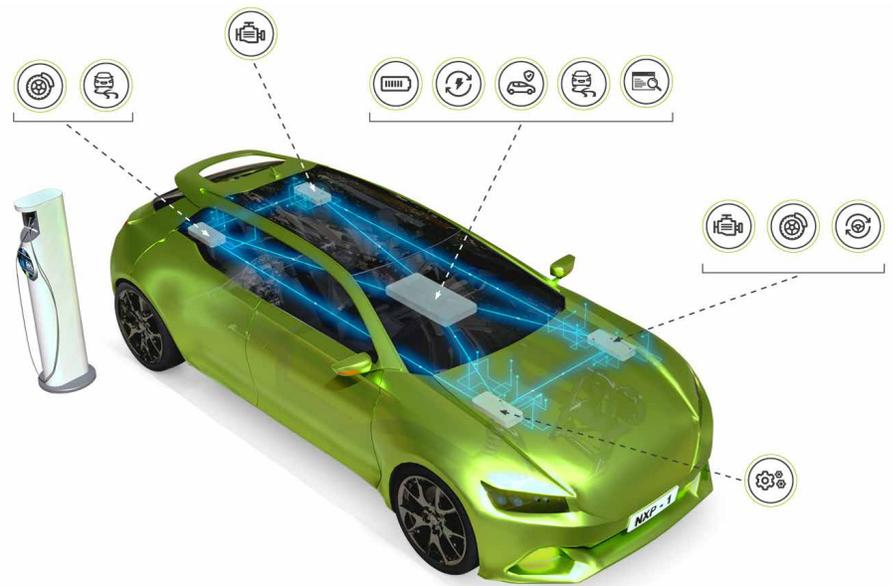
S32E2 high-performance real-time processors safely integrate real-time applications with unparalleled gigahertz speed, multi-application integration and memory expansion capabilities to enable new consolidated and software-defined vehicles. The S32E2 processors are ideal for electric vehicle (xEV) control and smart actuation.

The 16nm S32E2 processors combine real-time and DSP/ML processing with hardware virtualization, scalable non-volatile memory, flexible expansion memory support and network acceleration. The S32E2 processors provide smart actuation capabilities, specifically in the form of advanced timers and high-resolution analog-to-digital converters and 5V analog and I/Os, for xEV integration applications with direct-drive motor control. They are certified for compliance with ISO/SAE 21434 cybersecurity and ISO 26262 ASIL D functional safety. The S32E2 processors are software-compatible with the S32Z2 processors.

The S32E2 processors are enabled with GreenVIP Vehicle Integration Platform software and the GreenBox 3 development platform, along with a strong partner ecosystem.

TARGET APPLICATIONS

- Real-time applications integration
- Software-defined vehicles (SDV)
- Domain controllers such as xEV propulsion domain
 - Including Battery Management System (BMS) and Energy Management Systems (EMS)
 - Dual traction motor inverter control, on-board charger and DC/DC conversion
- Zonal gateways



ENABLEMENT

- GreenBox 3 development platform (S32E2-GRNBOX3)
- GreenVIP Vehicle Integration Platform reference software
- Support for AUTOSAR® OS, Zephyr® OS and FreeRTOS™ real-time operating systems
- Real-Time Drivers (RTD) including AUTOSAR MCAL support
- Inter-Platform Communication Framework (IPCF)
- S32 Design Studio IDE
 - GCC compiler, configuration tools (IVT, DCD, DDR, AUTOSAR), trace and debugger components, flash programmer
- Firmware for hardware accelerators (HSE, FlexLLCE)
- S32 Safety Software Framework (SAF)
- Automotive Math and Motor Control Library (AMMCLIB)
 - Support for Arm® Cortex®-R52 and DSP/ML processors
- AI/ML enablement (NXP eIQ® Auto)

SAFEASSURE FUNCTIONAL SAFETY PROGRAM

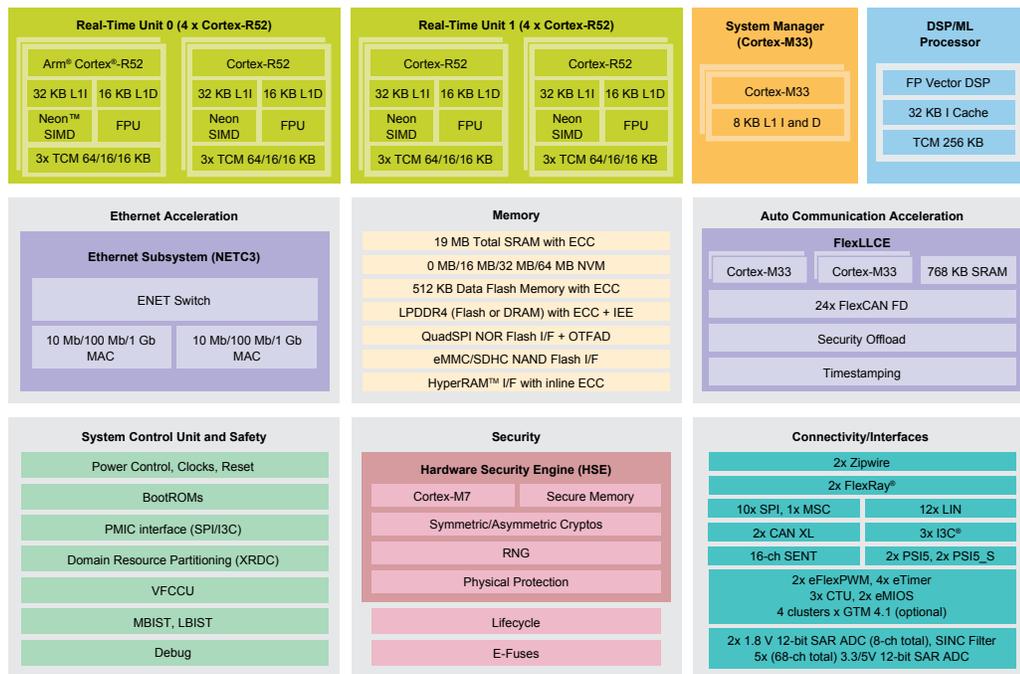
Functional safety. Simplified.

Our SafeAssure functional safety program is designed to help system manufacturers more easily achieve system compliance with International Standards Organization (ISO) 26262 and International Electrotechnical Commission (IEC)

61508 functional safety standards. The program highlights our hardware and software solutions that are optimally designed to support functional safety implementations and come with a rich set of enablement collateral.

For more information, visit www.nxp.com/SafeAssure.

S32E2 BLOCK DIAGRAM



S32E2 SAFE AND SECURE HIGH-PERFORMANCE REAL-TIME PROCESSORS

Key Features	Benefit(s)
Up to gigahertz-class real-time processing	Highest performance real-time processors beyond traditional microcontrollers (MCUs) to support more applications integration and more complex control applications
“Core-to-Pin” hardware virtualization	End-to-end, hardware isolation for diverse, multi-tenant real-time applications, providing freedom from interference, improved system resiliency for high availability and support for ASIL D functional safety applications
Up to 64 MB of flash memory	Scalable solution that can support larger applications and storage than traditional MCUs. Supports larger zero-downtime Over-the-Air (OTA) updates
LPDDR interface for DRAM and flash expansion memory	Supports eExecute-in-Place (XiP) for large applications and ability to support AUTOSAR Adaptive Platform island for software-defined vehicles (SDV)
Integrated DSP/ML processor	Accelerates advanced, predictive control algorithms using math/digital signal processing (DSP) and machine learning (ML)
Advanced networking with integrated Time-Sensitive Networking (TSN) Gigabit Ethernet switch and flexible communications accelerator	Provides Ethernet networking for zonal architectures and multi-chip, real-time processing farms and efficient CAN data filtering and routing to provide data seamlessly to virtual ECUs
Zipwire interprocessor communication interface	Supports remote actuation for coordinated processing
Integrated actuation support (with complex timers and 5V I/O and analog)	Supports EV actuation that offers higher integration for cost and PCB area savings
Certified for ISO/SAE 21434 with Hardware Security Engine (HSE) and safe cryptography accelerators for LPDDR and CAN interfaces	Provides accelerated Public Key Infrastructure (PKI) support for secure boot and Over-the-Air (OTA) upgradability. Enhanced safety and security for memory and CAN interfaces

www.nxp.com/S32E2

NXP, the NXP logo and NXP SECURE CONNECTIONS FOR A SMARTER WORLD are trademarks of NXP B.V. All other product or service names are the property of their respective owners. Arm, Cortex and Neon are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all patents, copyrights, designs and trade secrets. All rights reserved. © 2022 NXP B.V.

Document Number: S32E2FS REV 0



S32

