

S32K3 AUTOMOTIVE MCU FAMILY SIMPLIFIES SOFTWARE DEVELOPMENT

The S32K3 family includes scalable 32-bit Arm® Cortex® -M7 based MCUs in single, dual and Lockstep core configurations supporting up to ASIL-D level safety. Features include a hardware security subsystem with NXP firmware, support for firmware over-the-air (FOTA) updates and free ISO 26262 compliant real-time software drivers for AUTOSAR® and non-AUTOSAR. S32K3 MCUs are available in NXP's new MaxQFP packaging technology which reduces package footprint by up to 55% compared with standard QFP package.

FEATURES AND PERFORMANCE

- Lockstep Arm Cortex-M7 cores, 120-240 MHz + FPU
- 512KB 8MB Flash with ECC
- FOTA A/B firmware swap with zero downtime and roll-back support. Automatic address translation
- 12-bit 1Msps ADCs, 16-bit eMIOS timers with logic control unit for motor control
- Low power Run and Standby modes, fast wake-up, clock and power gating
- MaxQFP and BGA packages

SAFETY, SECURITY AND CONNECTIVITY

- ISO 26262 up to ASIL-D
- Fault collection and control unit
- Hardware and software watchdogs, clock/power/ temperature monitors
- Safety documentation and SafeAssure community support



- HSE security engine AES-128/192/256, RSA and ECC encryption; secure boot and key storage; side channel protection; ISO 21434 intended
- Ethernet TSN and AVB (10/100 Mbps), I3C, CAN-FD, FlexIO (SPI/IIC/IIS/SENT protocol), serial audio interface, QSPI

PRODUCTION-GRADE SOFTWARE

- Real-time Drivers free of charge (AUTOSAR and non-AUTOSAR), ASIL-D compliant
- Security firmware NXP provided, field upgradeable
- Safety Framework Software, Core Self-Test library
- S32 Design Studio IDE Eclipse, GCC and debugger, 3rd party support
- MATLAB® Model Based Design Tools

MAXQFP PACKAGE TECHNOLOGY

- QFP 'gull-wing' + PLCC 'J-lead' in single package
- 172-pin (16 x 16 mm), 100-pin (10 x 10 mm), 0.65 mm pin pitch
- AEC-Q100 qualified
- -40 to +125 °C ambient temperature



S32K3 FAMILY BLOCK DIAGRAM

| Production Development / subject to change | | | | | | | | | | | | |
|--|-----------------------------------|--|---|-------------------------|------------------------|----------------------------------|------------------------|-------------------|--------------------------|--------------------------|----------------------------|----------------------------|
| K311 | K312 | K314 | Common Features | K322 | K324 | K341 | K342 | K344 | K328 | K338 | K348 | K358 |
| | | 1x Cortex-M7 @160MHz | AEC-Q100, 125°C, 3.3/5V HSE-B | 2x Cortex-M7 @160MHz | | 1 Lockstep Cortex-M7 @ 160MHz | | | 2x Cortex-M@ @ 160MHz | 3x Cortex-M7 @ 240MHz | 1 LS Cortex-M7 @ 160MHz | 1 LS Cortex-M7 @ 240MHz |
| 1MB Flash | 2MB Flash | 4MB Flash | Crypto Security Engine | 2MB Flash | 4MB Flash | 1MB Flash | 2MB Flash | 4MB Flash | 8MB Flash | | | |
| 128K SRAM | 192K SRAM | 512K SRAM | FOTA (Firmware Over-the-Air) | 256k SRAM | 512k SRAM | 256k SRAM | 256k SRAM | 512k SRAM | 1152KB SRAM | 1152KB SRAM | 1152KB SRAM | 1152KB SRAM |
| up to 84 I/Os | up to 143 I/Os | up to 218 I/Os | Low power operating | up to 143 I/Os | up to 218 I/Os | up to 143 I/Os | up to 143 I/Os | up to 218 I/Os | up to 218 I/Os | | | |
| 16 channel eDMA 32ch eDMA | | 32ch eDMA | modes & peripherals (LP UART, FlexIO) | 32 channel eDMA | | | | | | | | |
| 3x CAN (3x FD) | 6x CAN | (6x FD) | ASIL B/D Safety: | 4x CAN (4x FD) | 6x CAN (6x FD) | 4x CAN (4x FD) | 4x CAN (4x FD) | 6x CAN (6x FD) | 8x CAN (8x FD) | 8x CAN (8x FD) | 8x CAN (8x FD) | 8x CAN (8x FD) |
| 100 Mbps Ethernet (TSN) | | (ECC memories, MPU, CRC, Watchdogs) | 100 Mbps Ethernet (TSN) | | | | | | | | | |
| 1x I3C & 2 x I2C | 1x I3C & 2 x I2C | 2x I2C | eMIOS Timers, Analogue | 1x I3C & 2 x I2C | 2x I2C | 1x I3C & 2x I2C | 1x I3C & 2x I2C | 2x I2C | 1x I3C & 2x I2C | | | |
| 4x 5 | 4x SPI* 2x 24-ch 12-bit ADC | | Comparator, Logic Control Unit, Body Cross Triggering Unit, Trigger Mux JTAG | 4x SPI* | 6x SPI* | 4x SPI* | 4x SPI* | | 6x SPI* | | | |
| | | | | 2x 24-ch 12-bit ADC | 3x 24-ch 12-bit ADC | 2x 24-ch 12-bit ADC | 2x 24-ch 12-bit ADC | | 3x 24-ch 12-bit ADC | | | |
| 2x SAI (I2S) | | S32 Design Studio IDE | 2x SAI (I2S) | | | | | | | | | |
| Quad SPI | | | • | Quad SPI | | | | | | | | |
| | LQFP-48 MaxQFP-172 | | Real Time Drivers - (AUTOSAR® & Non-AUTOSAR) | MaxQFP-172 | | | | | | | | |
| MaxQFP-100 | | | | MaxQFP-100 | | MaxQFP-100 | MaxQFP-100 | | | | | |
| | | MAPBGA-257 | Security F/W Safety Software Framework Application SW | | MAPBGA-257 | | | MAPBGA-257 | | MAPB | GA-289 | |

^{*}Ethernet 10BaseT1S supported by SPI + external MAC&PHY

PARTNERS

- IAR Systems
- Arm Keil
- Green Hills
- iSystem
- PandE Micro
- Lauterbach
- Vector
- Elektrobit
- ETAS
- MathWorks
- Airbiquity

APPLICATIONS

_

- Body controllers
- Zone controllers
- Battery management systems
- Infotainment IO controller
- E-shifter
- Motor control BSG, turbo charger, fan/pump controller

nxp.com/S32K3