



S32V234

S32V234 Processor and Graphics Libraries for Safety Critical Systems

The S32V234 is a robust, efficient, flexible solution for safety critical vision and sensor fusion applications. Targeted for RTCA DO-254/DO-178C and EUROCAE ED-80/ED-12C applications, the S32V234, is a high performance processor designed to support safe computation-intensive applications in the area of vision, sensor fusion and graphics. The high performance graphics and display are support by CoreAVI's **ArgusCore SC™** a suite of real time OpenGL SC 1.0.1 and OpenGL SC 2.0 scalable graphics drivers designed to achieve the highest levels of safety critical certifications, including FAA DO-178C / EASA ED-12C Level A, ISO 26262 ASIL D and CENELEC EN-50128 SSIL 4 certification.



Designed For Safety Critical Graphics Applications

The S32V234 was designed by NXP following a functional safety design process. This resulted in significant benefits including collateral to help support safety analysis (e.g. device level FMEDA) and architectural differentiation. Architectural differentiation includes Built-In-Self-Test (BIST) for logic and internal memory, ECC/Parity, monitors for clock, temperature and supply voltage, safe DMA, and others. In addition, two S32V234 chips can be placed into a shared memory mode which allows them to see each other's memory and compare results for increased safety.

Heterogeneous Mix of CPU, GPU and Image Processors

The CPU core platform includes a quad-core 1 GHz ARM® Cortex®-A53 section along with a ARM Cortex-M4 microcontroller. The ARM Cortex-A53 CPU is a 64-bit (ARMv8) core that offers balanced performance along with low power and cost-effective die area. To support reliability requirements, the processors all have error correcting codes (ECC) protection the data and instructions to the processor caches, the internal 4MB scratchpad memory, and the DRAM memory

High Performance Graphics and Video

The GPU is a VeriSilicon Vivante GC3000 3D graphics processor which is one of the highest performance per square millimeter of die area GPUs available with support for IEEE floating point GPU compute. The GC3000 is fully supported with a graphics and video driver suite (**ArgusCore™**) that includes OpenGL SC 1.0.1 and OpenGL SC 2.0, H.264 video decoder (**DecodeCore™**), and encoder (**EncodeCore™**), GPU safety monitor (**TrueCore™**), and comprehensive GPU Built-In-Test capabilities. This driver suite is available with certification evidence to provide the basis for a complete certifiable graphics solution for Avionics DO-178C Levels D through A (**CertCore178™**), ISO 26262 Automotive Safety Integrity Levels (ASIL) A through D (**CertCore26262™**) and Rail EN 50129 Software Safety Integrity Levels (SSIL) 1 through 4 (**CertCore50128™**).

The Image Signal Processor (ISP) is an image preprocessor designed for functions like dead pixel processing, correction of geometric distortions, High Dynamic Range (HDR) processing, image scaling, color corrections, and others.

Security

Includes the NXP Crypto Security Engine (CSE) and ARM TrustZone® technology. The CSE module implements the security functions described in the Secure Hardware Extension (SHE) functional specification including secure key storage, AES encryption, secure boot, AES CMAC authentication and random number generation.

Addressing SWaP Requirements

The S32V234 is packaged as a low power 17x17FC-BGA with an extended operating temperature range of -40C to +125C (junction Temperature).



Key Features	Benefits
Designed and manufactured to satisfy auto reliability and safety requirements	Enables DO-254 assessment for avionics applications and ISO 26262 for automotive safety applications
Quad 1 GHz ARM® Cortex®-A53 + ARM NEON™ core platform	9.2 K DMIPS processing horsepower (without acceleration)
ARM Cortex-M4 at 133 MHz for I/O control	Enables control interfaces to external devices without impacting ARM Cortex-A53 performance
Embedded security	Security engine together with ARM TrustZone® technology provides protection against IP theft and malicious hacking
Dual APEX-2 image processing engine	Allows high-performance, low-power processing of incoming image data
Image signal processor	Performs image housekeeping tasks such as HDR and color conversion, plus some dedicated image processing tasks
3D graphics processing unit (3D GPU)	For rendering 3D images; may also be used for additional image analysis tasks
Video input: dual MIPI-SCI; dual video input unit (VIU)	Supports mono, stereo and surround view camera inputs; H.264 decode and encode also supported
Memory interfaces	DRAM support for LPDDR2/DDR3L/DDR3 for high bandwidth data access, plus Dual QuadSPI

S32V234 Block Diagram

