

Octa-core 64-bit Platform Processor

Overview

A523 series features high-performance platform processors for medium- and high-end tablets and interactive display applications. It integrates octa-core Cortex™-A55 CPU, RISC-V, and G57 MC01 GPU to ensure rapid response and smooth running for daily applications, such as on-line video, web browsing, 3D game, and so on. A523 series also supports DDR3/DDR3L/DDR4/LPDDR3/LPDDR4/LPDDR4X, eMMC, NAND, SPI NAND, high-speed interfaces (PCIe2.1 and USB3.1 GEN1), multi-video output interfaces (RGB/Dual-LVDS/2xMIPI-DSI/eDP), and video input interfaces (MIPI CSI). In addition, this chip family supports 4K@60fps H.265 decoder, 4K@25fps H.264 encoder, DI, and SmartColor system to provide users with outstanding experience. A523 series can be applied in the tablet PC market and the interactive terminal market.

Highlight

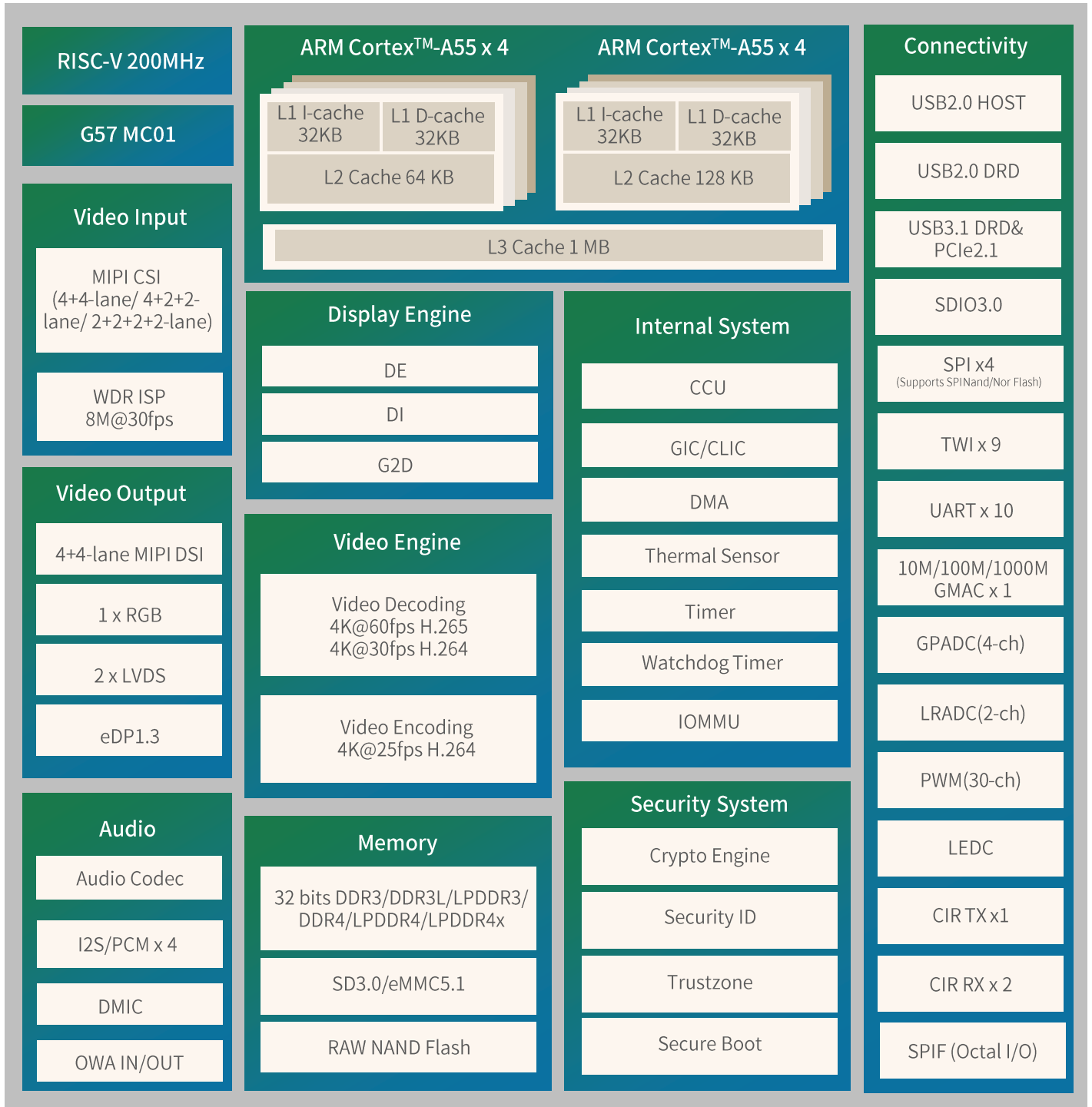
- High performance: A523 series integrates 8 x A55 CPU, RISC-V, G57 MC01 GPU, and 4GB DDR3/DDR3L/DDR4/LPDDR3/LPDDR4/LPDDR4X, which provides users with outstanding experience.
- Video multimedia: Supports full format video playback, 4K@60fps H.265 video decoder, and 4K@25fps H.264 video encoder.
- Video output: Supports multi video output interfaces such as RGB888, MIPI-DSI, dual link LVDS, and eDP to achieve different display in dual screen.
- Video input: Integrated MIPI CSI can support maximum 4-ch HD camera inputs to achieve differentiated visual functions.
- Rich interfaces: 2 x USB 2.0, 1 x PCIE 2.1&USB 3.1 combo, 1 x GMAC, 10 x UART, 9 x TWI, 30-ch PWM, and 4-ch GPADC greatly facilitate product expansion.

Features

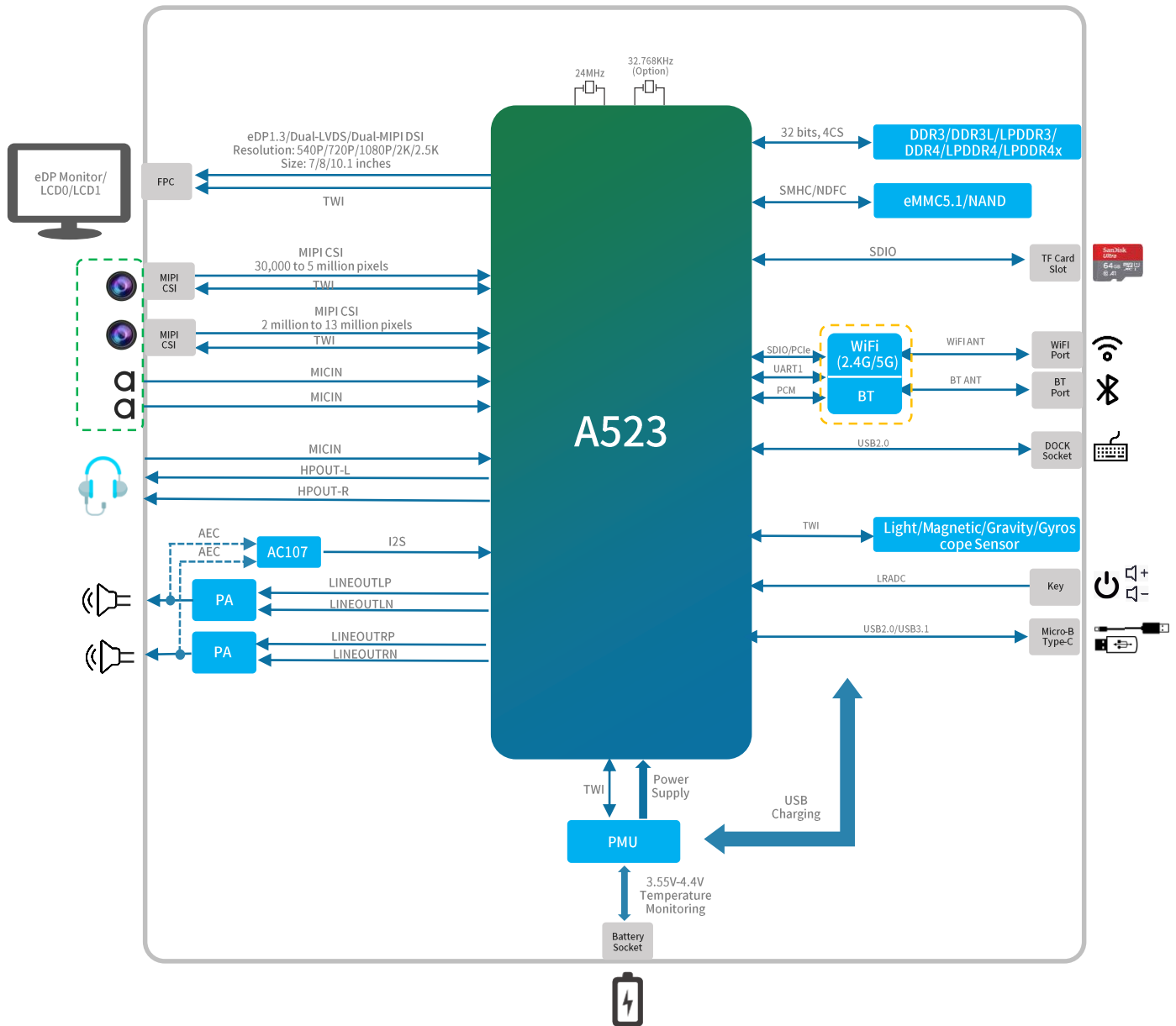
CPU	<ul style="list-style-type: none"> • Octa-core ARM Cortex™-A55, up to 2.0 GHz • Single RISC-V CPU, up to 200 MHz
GPU	<ul style="list-style-type: none"> • ARM G57 MC01 • Supports OpenGL ES 3.2/2.0/1.0, Vulkan 1.1/1.2/1.3, OpenCL 2.0
Memory	<ul style="list-style-type: none"> • 32-bit DDR3/DDR3L/LPDDR3/DDR4/LPDDR4/LPDDR4X interfaces, supporting maximum capacity of 4GB • 4 chip select lines for LPDDR3, LPDDR4, and LPDDR4X (especially the 64-bit LPDDR3, LPDDR4, and LPDDR4X) • SD3.0/eMMC5.1 interface • 8-bit Nand flash interface with maximum 80-bit/1KB ECC
Video Engine	<p>Video decoder</p> <ul style="list-style-type: none"> • H.265 MP decoder up to 4K@60fps • H.264 BL/MP/HP decoder up to 4K@30fps • VP9 decoder up to 4K@60fps • Multi-format 1080p@60fps video playback, including VP8, MPEG1/2 SP/MP, MPEG4 SP/ASP, AVS+/AVS JIZHUN <p>Video encoder</p> <ul style="list-style-type: none"> • H.264 encoder up to 4K@25fps • MJPEG encoder up to 4K@15fps • JPEG encoder up to 8K x 8K resolution
Video Input	<ul style="list-style-type: none"> • 4+4-lane , 2+2+2+2-lane, or 4+2+2 MIPI CSI, up to 2.0 Gbit/s per lane in HS transmission, compliant with MIPI-CSI2 V1.1 and MIPI DPHY V1.1 • Maximum video capture resolution of 8M@30fps • Supports formats: YUV422, YUV420, RAW-8, RAW-10, RAW-12
Video Output	<ul style="list-style-type: none"> • 4+4-lane MIPI-DSI output interface up to 2.5K@60fps • LVDS interface with dual link, up to 1080p@60fps • One RGB interface with DE/SYNC mode, up to 1080p@60fps • eDP 1.3 up to 2.5K@60fps
Audio	<ul style="list-style-type: none"> • 2 DACs and 3 ADCs • 3 x audio outputs: LINEOUTLP/N, LINEOUTRP/N, HPOUTL/R • 3 x audio inputs: MICIN1P/N, MICIN2P/N, MICIN3P/N • Embedded 4 I2S/PCM interfaces, supporting maximum 16 channels, 8 kHz-384 kHz sample rate, and 8-bit-32-bit width • Maximum 8 digital PDM microphones (DMIC) • One OWA input and one OWA output
Security Engine	<ul style="list-style-type: none"> • Supports Full Disk Encryption • AES, DES, 3DES, and SM4 encryption and decryption algorithms • MD5, SHA, and HMAC tamper proofing • RSA, ECC signature and verification algorithms • Supports 160-bit hardware pseudo random number generator(PRNG) with 175-bit seed • Supports 256-bit hardware true random number generator(TRNG) • Integrated 4K-bit EFUSE for chip ID and security application
Connectivity	<ul style="list-style-type: none"> • 1 x USB2.0 Host, 1 x USB2.0 DRD, 1 x USB3.1 DRD & PCIe2.1 Combo • 1 x GMAC (10/100/1000 Mbit/s port with RGMII and RMII interfaces) • 2 x CIR RX, 1 x CIR TX, 9 x TWI, 4 x SPI, 10 x UART • 30-ch PWM, 4-ch GPADC, 2-ch LRADC • SDIO 3.0, LEDC, SPIF (Octal I/O)

PMIC	<ul style="list-style-type: none"> Companion Allwinner Power Management IC
Package	<ul style="list-style-type: none"> FCCSP 522balls 15 mm x 15 mm size, 0.5 mm ball pitch, 0.3 mm ball size
Process	<ul style="list-style-type: none"> 22nm HPC

Block Diagram



Application Diagram



ABOUT ALLWINNER

Allwinner Technology, founded in 2007, is a outstanding designer dedicated to intelligent application SoC, high performance analog component and wireless connectivity IC. It is headquartered in Zhuhai China, with other R&D centers and offices in Shenzhen, HongKong, Xi'an, Beijing and Shanghai. Listed on the GEM of the Shenzhen Stock Exchange in 2015, with the stock code 300458.

Motivated by customer-oriented strategy, Allwinner aligns remarkable R&D teams with long-term core-technology investment in UHD video processing, high-performance multi-core CPU/GPU integration with AI and advanced manufacturing process in terms of high integration, ultra-low power consumption and full-stack integration platform, providing competitive turnkey solutions with considerate services. The products powered by Allwinner spread across from smart hardware, smart home, consumer electronics, HD media, smart video, connected car, industry control, wireless communication to analog products.

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