ALLWINER®

R818

Quad-Core Smart Device Processor
The most cost-effective speaker with screen

Overview

R818 is a powerful processor features with quad-core Cortex™-A53 CPU operating with frequency up to 1.6GHz. It also integrates GE8300 GPU, for UI rendering, integrates H.265 4K30 video decoder, for media player, integrates H.264 1080P60 encoder and 13MP camera ISP for video VOIP. R818 integrates two ADCs for two-mic voice solutions, integrates DMIC and I2S for multi-mic solutions, two DACs for stereo audio speaker. R818 also integrates IR transmission and IR reception for intelligent control of home devices. All of these make R818 provides a cost-effective solution for smart speakers with screen.

Highlights

High Processor Performance
R818 features quad-core CortexTM-A53 up to 1.6GHz, provide powerful and reliable computing power; integrated GPU GE8300, support OpenGLES1.1/2.0/3.2, Vulkan1.1,

High Video Performance
Video decoder H265 4K30, video encoder H264 1080P60, provides high performance for media play and video calling.

Rich Audio Interface
R818 integrates 2 audio ADCs and 2 audio DACs, 4 I2S and 8 channel DMIC, provides flexible solutions for 2 ~ 6 mic array and stereo speaker solution.
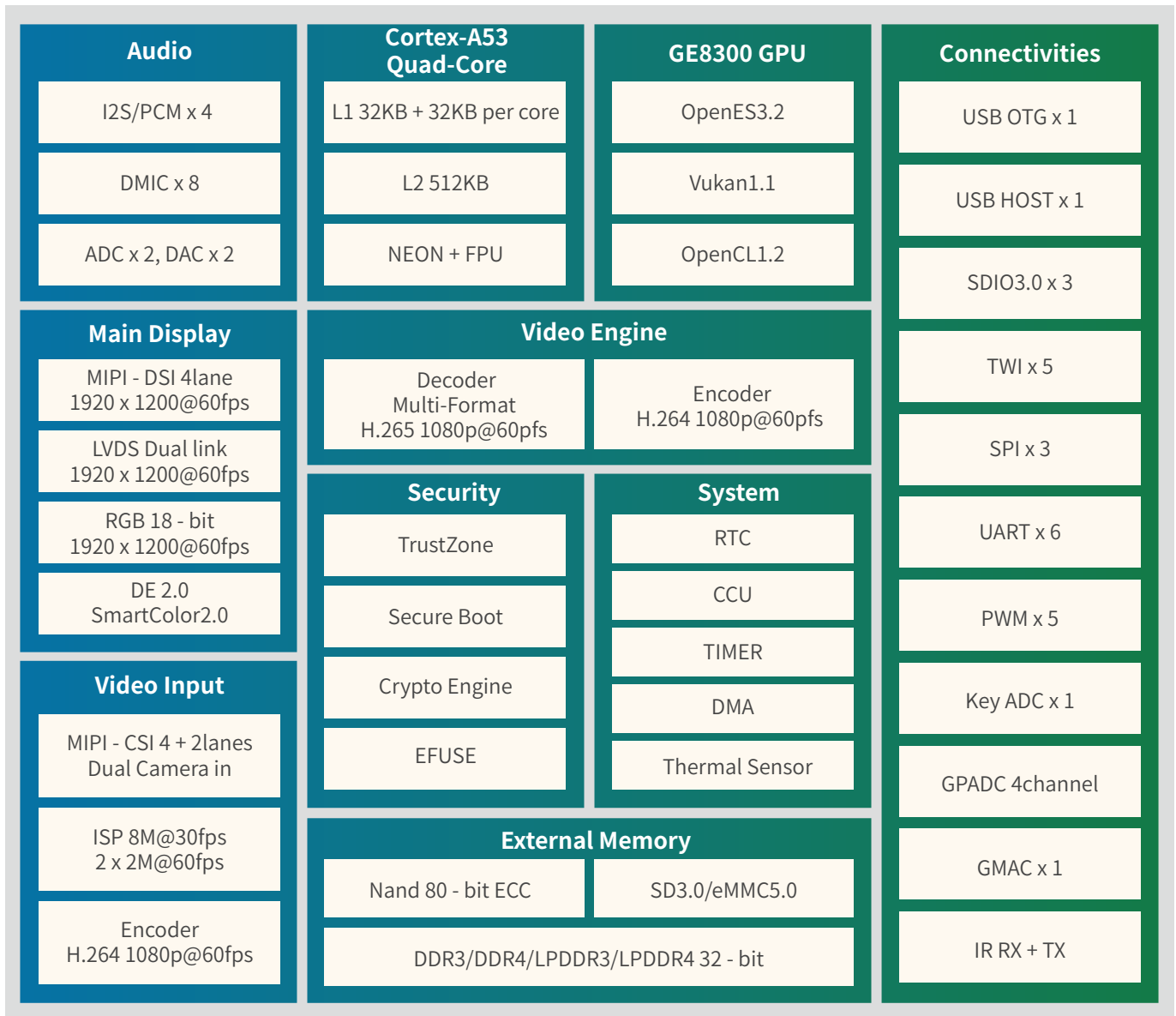
Features

CPU	• Quad-core ARM Cortex™-A53 up to 1.6GHz • 32KB L1 I-cache + 32KB L1 D-cache per core, 512KB L2 cache • Low-power CoolFlex™ power management architecture

GPU	• GE8300 500MHz • Supports OpenGLES1.1/2.0/3.2, Vulkan1.1, OpenCL1.2
Memory	• 32-bit DDR4/DDR3/DDR3L/LPDDR3/LPDDR4 • eMMC 5.0 • 8-bit TLC/MLC/SLC/EF NAND flash • SPI Nand flash
Audio	• Supports two audio DAC and two audio ADC • Supports two analog audio inputs and two analog audio outputs • Stereo Speaker and capless stereo headphone driver • Four I2S controllers for connecting Bluetooth and external audio codec • Integrated digital microphone supports maximum 8 digital microphones
Display	• Supports one channel MIPI DSI output, 4-lane, up to 1920×1200@60fps • Supports LVDS output with dual link, up to 1920×1200@60fps • Supports RGB interface with DE/SYNC mode, up to 1920×1200@60fps • Supports size up to 2048x2048, with two video layer and two UI layer • SmartColor2.0 post processing for an excellent display experience
Video	• Supports H.265 decoder 4k@30fps • Supports H.264 decoder 1080p@30fps • Supports VP8 decoder 1080p@60fps • Supports H.264 HP encoder 1080P@60fps • Supports MJPEG encoder 4k@15fps • Supports JPEG encoder 13M
CAMERA	• Compliant with MIPI-CSI2 V1.00 and MIPI DPHY V1.00.00 • 2 MIPI CSI input, 4 data lane and 2 data lane, up to 1Gbps per Lane in HS • Maximum to 8M@30fps or 13M@10fps, with 4 data lane • Supports format: YUV422-8bit/10bit, YUV420-8bit/10bit, RAW-8, RAW-10, RAW-12, RGB888, RGB565
ISP	• Up to 8M@30fps or 13M@10fps, can be config as dual 1080p@60fps • Adjustable 3A functions, including AE, AWB and AF • Supports spatial(2D) de-noise filter • Supports contrast enhance and sharping • Supports chrominance noise reduction • Supports defect pixel correction
Security	• Supports Symmetrical algorithm: AES, DES, 3DES, XTS, SM4 • Supports Hash algorithm: MD5, SHA, HMAC, SM3 • Supports Asymmetric algorithm: RSA, ECC, SM2 • Supports PRNG and TRNG • Supports 2K-bit EFUSE for chip ID and security application
Connectivity	• USB 2.0 OTG and HOST, SDIO 3.0, GMAC • SPI×3, TWI×5, 6xUART×6, PWM×5 • IR TX, IR RX, LEDC, GPADC, LRADC
PMIC	• AXP803 (w. charger) • AXP806 (wo. charger)
Package	• LFBGA 346balls • 12mm x 12mm size,0.5 ball pitch,0.3 ball size
Process	• 28nm HPC+
OS	• Android 10

Block Diagram

Audio
- I2S/PCM x 4
- DMIC x 8
- ADC x 2, DAC x 2

Cortex-A53 Quad-Core
- L1 32KB + 32KB per core
- L2 512KB
- NEON + FPU

GE8300 GPU
- OpenES3.2
- Vukan1.1
- OpenCL1.2

Connectivities
- USB OTG x 1
- USB HOST x 1
- SDIO3.0 x 3
- TWI x 5
- SPI x 3
- UART x 6
- PWM x 5
- Key ADC x 1
- GPADC 4channel
- GMAC x 1
- IR RX + TX

Main Display
- MIPI - DSI 4lane 1920 x 1200@60fps
- LVDS Dual link 1920 x 1200@60fps
- RGB 18 - bit 1920 x 1200@60fps
- DE 2.0 SmartColor2.0

Video Engine
- Decoder Multi-Format H.265 1080p@60pfs
- Encoder H.264 1080p@60pfs

Security
- TrustZone
- Secure Boot
- Crypto Engine
- EFUSE

System
- RTC
- CCU
- TIMER
- DMA
- Thermal Sensor

Video Input
- MIPI - CSI 4 + 2lanes Dual Camera in
- ISP 8M@30fps 2 x 2M@60fps
- Encoder H.264 1080p@60fps

External Memory
- Nand 80 - bit ECC
- SD3.0/eMMC5.0
- DDR3/DDR4/LPDDR3/LPDDR4 32 - bit