ALLWINER

H618 ALLWINER

High Picture Quality
4K STB solution

Overview

H618 is a new-generation high picture quality 64-bit 4K@60fps decoding SoC provided by Allwinner for the OTT and IPTV markets. It integrates the quad core 64-bit Cortex™-A53 processor, and the new G31 GPU engine of ARM that supports OpenGL ES 3.2/Vulkan 1.1. Besides, H618 supports full-format 4K@60fps 10-bit ultra-HD video decoding, Allwinner self-developed SmartColor3.3™ picture enhancement engine, Dolby, and DTS audio processing. H618 adopts the power consumption technology of the new generation, and reduces power consumption by 20% compared with the last generation.

Highlights

- **Quad core ARM Cortex™-A53, 64-bit architecture**
- **High performance multi-core G31 GPU, supporting OpenGL ES 3.2/Vulkan 1.1**
- **Full formats H.265/VP9/AVS2 4K@60fps decoding**
- **Maximum 6K@30fps H.265 decoding performance**
- **Low latency H.264 4K@25fps video encoding**
- **Supports HDR10, HLG**
- **SmartColor™ 3.3 picture enhancement engine**

Features

CPU

· Quad-core ARM Cortex™-A53

GPU

· G31 MP2
· Supports OpenGL ES 3.2/2.0/1.0, Vulkan 1.1, OpenCL 2.0

Memory

· 32-bit DDR4/DDR3/DDR3L/LPDDR3/LPDDR4 interface, supporting maximum capacity of 4GB
· SD3.0/eMMC5.0 interface
· 8-bit Nand flash interface with maximum 80-bit/1KB ECC

Video Engine

Video decoder:

- H.265 Main10@L5.1 decoder up to 4K@60fps or 6K@30fps
- VP9 Profile 2 decoder up to 4K@60fps
- AVS2 JiZhun 10bit decoder up to 4K@60fps
- H.264 BP/MP/HP@L4.2 decoder up to 4K@30fps
- Multi-format 1080p@60fps video playback formats, including H.264 BP/MP/HP, H.263 BP, VP8, MPEG-1 MP/HL, MPEG-2 MP/HL, MPEG-4 SP/ASP@L5, AVS+/AVS JiZhun, WMV9/VC1, etc

Video encoder:

- H.264 BP/MP/HP encoder up to 4K@25fps or 1080p@60fps
- JPEG snapshot performance of 1080p@60fps

Display and Graphic

- Output size up to 4096 x 2048
- Six alpha blending channels for main display
- Four overlay layers in each channel, and has an independent scaler
- Potter-duff compatible blending operation
- Supports AFBC buffer
- Supports keystone correction
- Frame Packing/Top-and-Bottom/Side-by-Side Full/Side-by-Side Half 3D format data
- Supports 10-bit processing path for HDR video
- Supports SDR/HDR10/HLG EOTF and color space conversion
- Supports SmartColor™ 3.3 for excellent display experience
- Supports one hardware accelerator for 2D graphic
- Supports one de-interlacing module

Display Output

- HDMI 2.0a up to 4K@60fps
- TV CVBS output, supporting PAL/NTSC

Package

- TFBGA 284balls
- 14 mm x 12 mm body size, 0.65 mm ball pitch, 0.35 mm ball size

Audio

- Two DAC channels
- Supports 1 audio output interface (differential LINEOUTP/N or single-end LINEOUTL/LINEOUTR)
- One Audio HUB, supporting internal mixing function
- Embedded 3 I2S/PCM (I2S0 for extended audio codec, I2S2 for BT, I2S3 for digital power amplifier)
- Supports Left-justified, Right-justified, Standard I2S mode, PCM mode, and TDM mode
- I2S mode supports 8 channels, and 32-bit/192kbit sample rate
- I2S and TDM modes support maximum 16 channels, and 32-bit/96kbit sample rate
- One OWA OUT interface, supporting 16-/20-/24-bit inputs and outputs
- Integrated digital microphone(DMIC), supporting maximum 8 digital PDM microphones
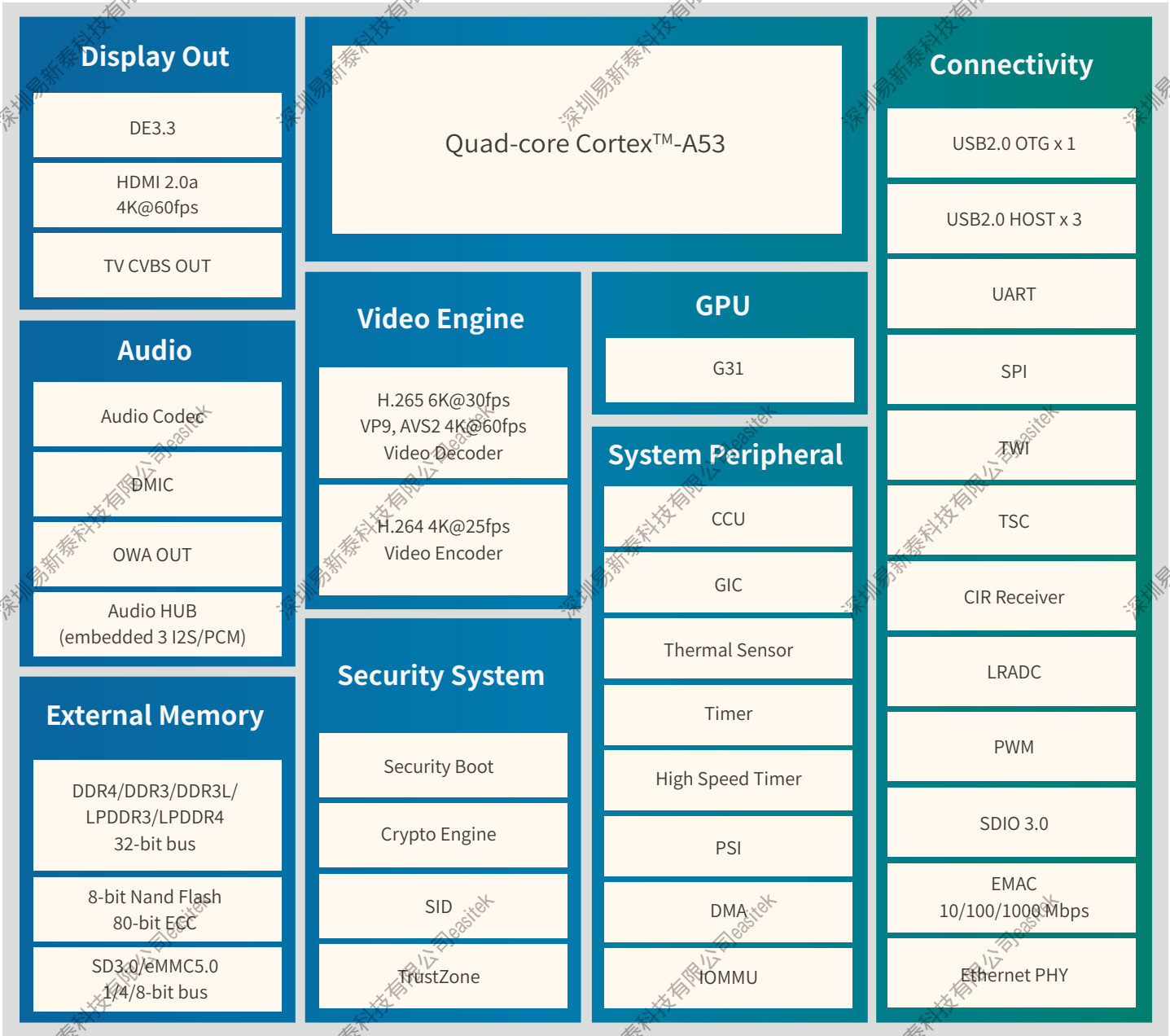
Security Engine

- Supports Full Disk Encryption
- AES, DES, 3DES, and XTS 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)
- Supports 256-bit hardware true random number generator(TRNG)
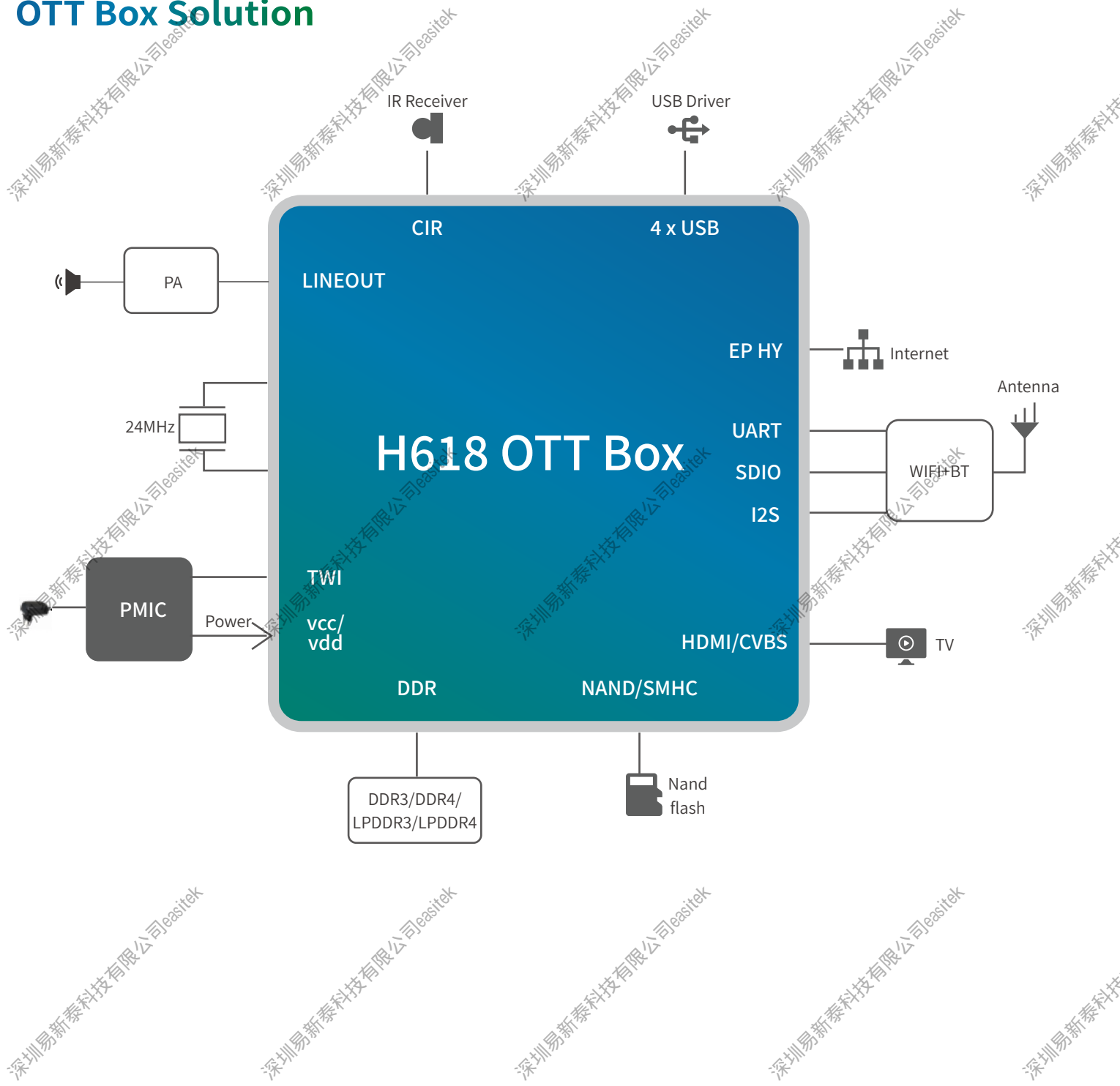- Integrated one EFUSE for chip ID and security application

Connectivity

- 3 x USB2.0 Host, 1 x USB2.0 OTG
- One 10/100/1000 Mbps Ethernet port with RGMII and RMII interfaces
- One 100Mbps Ethernet port with PHY
- SDIO 3.0, TSC, CIR Receiver
- TWI, SPI, UART
- PWM, LRADC

Block Diagram

Display Out
- DE3.3
- HDMI 2.0a 4K@60fps
- TV CVBS OUT

Audio
- Audio Codec
- DMIC
- OWA OUT
- Audio HUB (embedded 3 I2S/PCM)

External Memory
- DDR4/DDR3/DDR3L/ LPDDR3/LPDDR4 32-bit bus
- 8-bit Nand Flash 80-bit ECC
- SD3.0/eMMC5.0 1/4/8-bit bus

Quad-core Cortex™-A53

Video Engine
- H.265 6K@30fps VP9, AVS2 4K@60fps Video Decoder
- H.264 4K@25fps Video Encoder

Security System
- Security Boot
- Crypto Engine
- SID
- TrustZone

GPU
- G31

System Peripheral
- CCU
- GIC
- Thermal Sensor
- Timer
- High Speed Timer
- PSI
- DMA
- IOMMU

Connectivity
- USB2.0 OTG x 1
- USB2.0 HOST x 3
- UART
- SPI
- TWI
- TSC
- CIR Receiver
- LRADC
- PWM
- SDIO 3.0
- EMAC 10/100/1000 Mbps
- Ethernet PHY

OTT Box Solution

IR Receiver

USB Driver

H618 OTT Box

CIR

4 x USB

LINEOUT

PA

24MHz

EP HY — Internet

UART

SDIO — WIFI+BT — Antenna

I2S

TWI

PMIC — Power

vcc/vdd

HDMI/CVBS — TV

DDR

NAND/SMHC

DDR3/DDR4/LPDDR3/LPDDR4

Nand flash