



Features

CPU

- Quad-core ARM Cortex-A55 processor

GPU

- ARM G52-2EE
- OpenGL ES1.1/2.0/3.0/3.1/3.2, Vulkan 1.1, OpenCL 2.1

NPU

- 1TOPs@INT8
- Support INT8/INT16/FP16/BFP16
- Support deep learning frameworks: TensorFlow, Caffe, Tflite, Pytorch, Onnx, Android NN, etc

Memory

- 32bit DDR4/3/3L/LPDDR4/4X/3
- DRR4 and DDR3 support ECC
- Support eMMC 5.1, SFC

Display

- Multiple display engine, max 3 screen support
- HDMI2.0
- eDP 1.3
- Dual MIPI-DSI, combo with single LVDS
- 24bit RGB/BT1120
- EBC interface

Multi-Media

- 4K H.265/H.264/VP9 video decoder
- 1080p@60fps H.264/H.265 video encoder

Video Input

- 8M Pixel ISP with HDR&3DNR
- 1*4lanes or 2*2lanes MIPI CSI-2 and DVP interface

Audio Interface

- I2S0/I2S1 with 8 channels
- I2S2/I2S3 with 2 channels
- SPDIF0
- PDM0 with 8 channels
- TDM0 with 8 channels
- VAD (Voice Activity Detection)

High Speed Interface

- One USB 3.0 host, three SATA 3.0, one USB 3.0 OTG, one PCIe 2.1, one QSGMII
Share three serdes lanes
- Dual USB 2.0 host
- PCIe 3.0, 1*2 lanes or 2*1 lane
- Dual RGMII interface

Security

- ARM Trustzone security extension
- Secure Video Path
- Secure JTAG to debug
- Secure boot
- OTP
- Crypto (AES/TDES/SM4/SM3/SHA256/SHA512 /RSA)

SDK

- Linux4.19 & 5.10
- Android11 & 12

Device Information

- Package:
- FCBGA636L & FCCSP636L
- Body: 19mm x 19mm
Ball pitch: 0.65mm



- NAS
- Central Vehicle Controller
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Block Diagram

RK3568

Cortex-A55 Quad-Core

| Core0 | Core1 |
|--------------------------|--------------------------|
| 32KB L1 I-Cache | 32KB L1 I-Cache |
| 32KB L1 D-Cache with ECC | 32KB L1 D-Cache with ECC |
| NOEN/FPU/Crypto | NOEN/FPU/Crypto |
| Core2 | Core3 |
| 32KB L1 I-Cache | 32KB L1 I-Cache |
| 32KB L1 D-Cache with ECC | 32KB L1 D-Cache with ECC |
| NOEN/FPU/Crypto | NOEN/FPU/Crypto |

512KB L3-Cache with ECC

NPU

Multi-Media Processor

| | |
|---------------------|--------------------|
| 4K Video Decoder | GPU Mali-G52-2EE |
| 1080p Video Encoder | 2D Graphics Engine |
| JPEG Codec | IEP |
| 8M ISP | |

External Memory Interface

| | |
|---|------------------------|
| eMMC 5.1 | Nor Flash /Async SRAM |
| SD3.0/MMC4.51 | SDR/DDR/LBA Nand Flash |
| 32Bit DDR Controller (DDR3/DDR3L/DDR4 with ECC) (LPDDR3/LPDDR4/LPDDR4X) | |

System

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|----------------------|
| Clock & Reset |
| WDT |
| PLL x9 |
| Timer x6 |
| Secure Timer x2 |
| PMU |
| Crypto |
| Interrupt Controller |
| DMAC x2 |
| SARADC x8 |
| TSADC |
| MCU |
| Mailbox |

Multi-Media Interface

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|--|
| VOP (Three Display Port, 2HD for LCD/HDMI, 1SD for BT656 to CVBS) |
| HDMI2.0a |
| eDP1.3 |
| Single LVDS/ Dual MIPI-DSI_TX |
| Parallel RGB Interface |
| E-Ink Interface |
| 16bits Camera I/F |
| MIPI-CSI_RX 4 Lane |

Connectivity

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|--|
| PCIe3.0 1x2/2x1 Lane |
| PCIe2.1 x1/SATA3.0 x3 /USB3 HOST x1/USB3 OTG x1/QSGMII x1, Share 3 Serdes Lanes |
| USB2.0 HOSTx2 |
| I2S/TDM(8ch) x2, one for HDMI |
| I2S/PCM(2ch) x2 |
| PDM(8ch) |
| SPDIF(8ch) |
| Audio PWM |
| Digital Acodec |
| VAD |
| ISO7816 |
| UART x10 |
| SPI x4 |
| SDIO 3.0 |
| Ethernet GMAC x2 (10/100/1000M) |
| I2C x6 |
| CAN x3 |
| PWM x16 |
| GPIO x152 |

Embedded Memory

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|-------------|
| SRAM (64KB) |
| ROM (32KB) |
| OTP(8K bit) |

RK3568 Target Applications

- NAS
- Central Vehicle Controller
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Typical Application Diagram

