RK3568

A high-performance and low power quad-core application processor

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

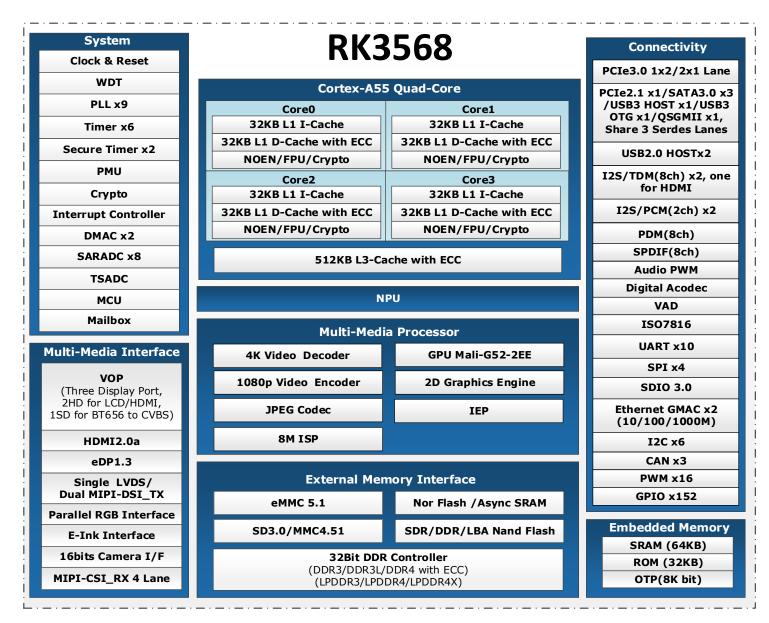### Device Information

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

RK3568 Target Applications

- NVR
- NAS
- Cloud Terminal
- Industrial Control
- Central Vehicle Controller
- Facial Recognition System

Block Diagram

RK3568

System

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

Multi-Media Interface

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

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)

Connectivity

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

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

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Typical Application Diagram