RENESAS

BIG IDEAS FOR EVERY SPACE

R-Car

64-BIT SoC Family
# RENESAS R-CAR V3U

Best-in-Class ASIL D System-on-Chip, 60 TOPS @ Low Power

The R-Car V3U SoC is the latest member of Renesas' Autonomy Platform.

It delivers highly flexible DNN (Deep Neural Processing) and AI machine learning functions. Its flexible architecture can handle any state-of-the-art neural networks providing up to 60 TOPS with low power consumption.

The SoC integrates multiple sophisticated safety mechanisms that provide high coverage, achieving ASIL D metrics

The R-Car V3U comes with an open and integrated development environment that enables fast time-to-market for computer vision and deep learning-based solutions.
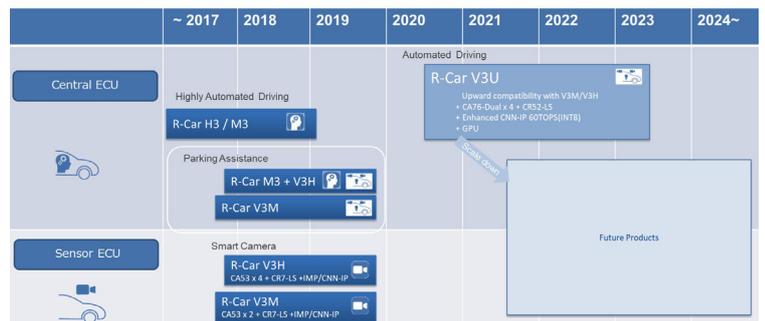

Target Applications

- Automated Driving L3 & above
- Parking & Surround View
- NCAP 2025 5 stars
- Passenger cars
- Commercial and off-road vehicles
- Industrial application (survey camera, …)

Key Features

- 8 Arm® Cortex®-A76, c onfigurable in LockStep
- Dual Cortex-R52 LockStep cores to run AUTOSAR.
- CNN IP delivering 60 TOPS
- Multi-Threading Computer Vision Engine
- Hardware accelerator: optical flow, object detection, …
- Dual DSP for Radar, TFT
- Integrated ISP
- Automotive interfaces: Ethernet AVB, CAN FD and FlexRay
- Multiple PCIe 4th generation
- ASIL D Process and metrics
- Low Power
- Secure Crypto engine

Block Diagram
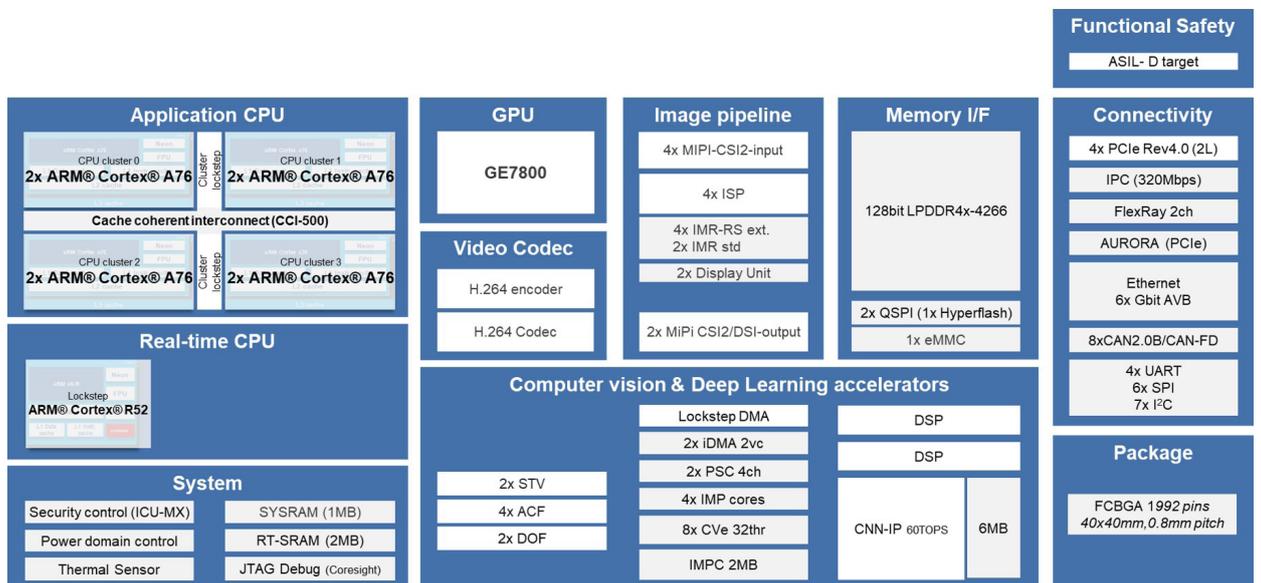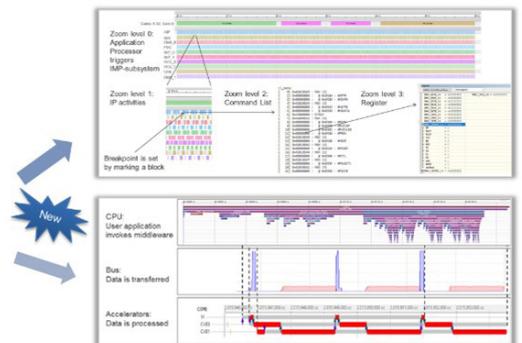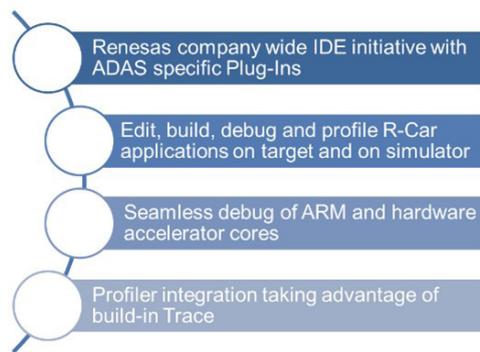
RENESAS R-CAR V3U

Benefits

- R-Car V3U is tailored for the Automated Driving use case, balancing innovation and automotive constraint.
- CNN IP delivering 60 TOPS, capable of handling any state-of-the-art neural networks for automated driving
- Low power consumption allowing air cooling systems and thus drastically BOM
- ASIL D SOC reduce SW development effort and remove the need additional redundant SoC
- Real time ASIL D CPU core avoiding the need of external MCU to handle Realtime Task and execute AUTOSAR SW.
- Multiple PCIe enabling easy scaling of V3U and smooth increase overall system performance.
- Integrated development environment enables fast time-to-market for computer vision and deep learning-based solutions.

Falcon Development Board

- NOR flash memory
- SDRAM: four LPDDR4X devices for DBSC4
- Display interface: mini display & GMSL output connector
- Video input interfaces: x3 GMSL input connectors
- Storage interface: eMMC memory for MMC
- Network interfaces:
  – PCIE (4 lanes)
  – Gigabit Ethernet (GbE)
  – Six Ethernet AVB ports (MATEnet) for EtherAVB0 to EtherAVB5
  – Two FlexRay connectors for FlexRay_A and FlexRay B
  – Peripheral interfaces: debug serial connector
- Debugger interfaces: 20-pins JTAG connector
- Power supply: two 12.0-V DC inputs
- Package includes CD with user's manual, schematic and boot SW

SW Development Environment

- Renesas company wide IDE initiative with ADAS specific Plug-Ins
- Edit, build, debug and profile R-Car applications on target and on simulator
- Seamless debug of ARM and hardware accelerator cores
- Profiler integration taking advantage of build-in Trace

HW Ordering Reference

Part name	Product
RTP8A779A0ASKB0FS0SA000#WS	Falcon Board Global
Y-RCAR-V3U-FALCON-BRD-DEV-WS10	Falcon Board Europe
R8A779A0DA01BA	R-Car V3U SoC

For more details, please visit www.renesas.com/r-car-V3U

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