1. **News Release**

No.: REN0755(A)

**Renesas Electronics Delivers R-Car V3H System-On-Chipfor Automotive Front Cameras in Level 3 and Level 4 Autonomous Vehicles**

*Enables AI Processing Required for Automotive Front Cameras with CNN IP at Industry-Leading Low Power Levels*

**Düsseldorf, February 27, 2018** – With the rapid enhancement of advanced driving assistance systems (ADAS) and automated driving technologies, autonomous-driving vehicles are becoming a reality. Renesas Electronics Corporation (TSE: 6723), an industry-leading supplier of automotive semiconductor solutions, today announced its new R-Car V3H system-on-chip (SoC) that delivers high computer vision performance and AI processing at industry-leading low power levels, targeting automotive front cameras for use in mass-produced Level 3 (conditional automation) and Level 4 (high automation) autonomous vehicles (Note 1). The new R-Car V3H system-on-chip (SoC) is optimized for use in stereo front cameras and achieves five times the computer vision performance of its predecessor, the [R-Car V3M](https://www.renesas.com/about/press-center/news/2017/news20170411c.html) SoC targeting NCAP (Note 2) front cameras, announced on April 11, 2017. Part of the open, innovative, and trusted Renesas autonomy™ Platform for advanced driver assistance systems (ADAS) and automated driving (AD), the R-Car V3H enables design flexibility for Tier 1s and OEMs to map their own road from assisted- to highly- automated vehicles.

**State-of-the-art R-Car recognition technology**

The R-Car V3H SoC focuses on architecture optimization for computer vision processing, enabling all relevant ADAS functions from conditional to highly automated driving. Leveraging Renesas’ concept of heterogeneous computer vision cores based on the IMP-X5+ image recognition engine and dedicated hardware accelerators, the R-Car V3H achieves advanced sensing capabilities with algorithms including Dense Optical Flow (Note 3), Dense Stereo Disparity (Note 4), and Object Classification (Note 5). The integrated IP for CNN (Note 6) accelerates deep learning at industry-leading low power levels of only 0.3 watts, achieving more than two times of the deep neural network performance of the R-Car V3M.

**Scalability and cost saving**

Relying on proven IPs already used in the R-Car V3M, the R-Car V3H includes a dual Image Signal Processor (ISP) that converts camera sensor signals for image creation and recognition processing. The re-use ensures scalability from NCAP systems -using R-Car V3M- to level 3 and 4 smart camera systems -using R-Car V3H-, reducing both development time as well as system costs by avoiding the need for ISPs in each camera. For further system cost savings, the R-Car V3H requires only a single LPDDR4 memory, reducing the cost for memory components compared to other solutions for front cameras.

**Open platform solution**

Tier1s and OEMs have the choice to develop a front camera solution by themselves or work with leading partners from the Renesas autonomy ecosystem, which is supported by leading front camera partners including HELLA Aglaia.

"The R-Car V3H specification and design was done by cooperating closely with front camera market leaders to ensure we addressed the requirements of those leading innovations on autonomous driving systems. As the automotive semiconductor industry leader, Renesas is committed to providing open, innovative, and trusted solutions for assisted and automated driving,” said Jean-Francois Chouteau, Vice President, Renesas Electronics Corporation. “Besides featuring state-of-the-art computer vision performance at a very competitive system cost, what our customers like above all with R-Car-V3H is being able to keep the freedom to implement a front camera with their own differentiators and still benefit from scalable solutions between R-Car V3M and R-Car V3H.”

**Availability**

Samples of the R-Car V3H SoC will be available from Q4. Mass production is scheduled to begin in Q3, 2019. (Availability is subject to change without notice.)

Renesas will demonstrate the new R-Car V3H at embedded world 2018 (Stand 310, Hall 1), which takes place February 27 to March 1, 2018 in Nuremberg, Germany.

Please refer to the [separate sheet](https://www.renesas.com/en-eu/media/about/press-center/news/2018/news20180228a/20180228a-r-car-v3h-specs.pdf) for product specifications of the R-Car V3H.

(Note 1) Level 3 (conditional automation) and Level 4 (high automation) of the SAE International’s new standard J3016

Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems, delivers a harmonized classification system and supporting definitions that identify six levels of driving automation from “no automation” to “full automation”.

(Note 2) NCAP (New Car Assessment Program):

A government car safety program tasked with evaluating new automobile designs for performance against various safety threats.

(Note 3) Dense Optical Flow is used to accurately track movement of objects

(Note 4) Dense Stereo Disparity is used to measure distance in 3D using all pixel units of the camera image

(Note 5) Object Classification is used to identify objects

(Note 6) Convolutional neural networks (CNNs), are deep, feed-forward artificial neural networks that have been successfully applied for analyzing visual imagery and are increasingly used in automotive for applications like road detection or object classification.

**About Renesas Electronics Corporation**

Renesas Electronics Corporation ([TSE: 6723](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.jpx.co.jp_english_&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=UlMPBZIH1yicvEPu6e6QHB45plYIXPqV-0XV5KGZZl0&e=)) delivers trusted embedded design innovation with complete semiconductor solutions that enable billions of connected, intelligent devices to enhance the way people work and live—securely and safely. A [global](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.renesas.com_en-2Dhq_about_company_profile_global.html&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=QqlGBR6MYbo1eiGXo2ZMywSeWE80hPtBOrhrwz73p94&e=) leader in microcontrollers, analog, power and SoC products, Renesas provides the expertise, quality, and comprehensive solutions for a broad range of Automotive, Industrial, Home Electronics, Office Automation and Information Communication Technology applications to help shape a limitless future. Learn more at [renesas.com](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.renesas.com_&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=K6LsuehJosLLwcPcYTcAHq30edFyKPiV7ZQDlE_PO1A&e=).

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