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### **Ricoh launches two VFM mode Buck DC/DC Converters with Ultra-low Output Voltage for wearables and IoT devices**

**Osaka, Japan, July 3, 2019** – Ricoh Electronic Devices Co., Ltd. in Japan has launched two Buck DC/DC Converters RP516 and RP517, designed for use in wearable devices and applications for Internet of Things requiring advanced solutions extending battery life, reducing mounting area and weight on high density boards.

Today's wearable and IoT devices mainly operate in a sleep mode and therefore power consumption is significantly defined by the quiescent current, referring to a circuit's quiet state, not driving any load. In this mode, the system is idle but ready to wake up at any time to perform a task, transmitting some data and resume to sleep mode again.

The RP516 and RP517 are optimized to prolong battery life and are designed for applications that require a low supply voltage in between 0.3 and 1.2 V. This kind of power supply is tailored to support the newest generation of low power MCU's, GPS/GNSS receiver/processors and other ICs which are required in IoT applications for a low power wireless sensor network and wearable devices.

The DC/DC Converters operate in a VFM mode and the efficiency at light loads in particular was considerably improved and has a peak at 75%, even at 0.01 mA output current an efficiency performance of about 67% is achieved (conditions:  $V_{out}=0.5V$ ,  $V_{in}=1.8V$ ). The impressive low quiescent current of only 300 nA also contributes to extend battery life or makes it possible for the designer to select a smaller sized battery for the application. The main difference between the two products is their output current power; they deliver 100 and 300 mA respectively. Both products offer synchronous rectification and have high and low side MOSFET driver



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transistors embedded. Three different packages are available: A standard SOT-89-5, leadless DFN2527-10 or the most compact WLCSP-8-P1 package. By using the proposed external components, it takes up only 8.3 mm<sup>2</sup> of printed circuit board area. Thanks to the wide input voltage range, the two DC/DC Converters are able to operate from various power supplies like a USB port, a single cell Li-Ion and other regular batteries.

Protection circuits are integrated: An Under Voltage Lock-Out circuit disabling the DC/DC Converter in case the input voltage drops below a minimum threshold. A soft-start circuit controls the output voltage to ramp-up smoothly, preventing any output overshoot and undershoot during the start-up period. The Lx current limit circuit prevents the peak current through the inductor to exceed a specific maximum current threshold. The RP516 and RP517 have an optional auto-discharge function; this feature rapidly discharges the output capacitor once the CE pin disables the chip.

### Features RP516 / RP517

Input Voltage Range	1.8 V to 5.5 V
Output Voltage Range	(in 0.1 V step) 0.3 V to 1.2 V
Output Voltage Accuracy	±18 mV
Output Current	100 mA / 300 mA
Quiescent Current	(device not switching) Typ. 300 nA
Standby Current	0.01 µA
PMOS On-Resistance	(Vin = 3.6V, RP516Z / RP517Z) 0.15 Ω
NMOS On-Resistance	(Vin = 3.6V, RP516Z / RP517Z) 0.15 Ω
Protection Circuits	UVLO, Soft-Start, Lx Current Limit
Peak Efficiency	(Vin = 1.8 V, Vout = 0.5 V) 75%
Operating Mode / Frequency	VFM / Up to 1 MHz
Auto-Discharge Function	Optional
Package	WLCSP-8-P1, DFN2527-10, SOT89-5
Datasheet	<a href="https://www.e-devices.rioh.co.jp/en/products/power/dcdc/rp516/">https://www.e-devices.rioh.co.jp/en/products/power/dcdc/rp516/</a> <a href="https://www.e-devices.rioh.co.jp/en/products/power/dcdc/rp517/">https://www.e-devices.rioh.co.jp/en/products/power/dcdc/rp517/</a>

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### About Ricoh Electronic Devices Co., Ltd

Ricoh Electronic Devices Co., Ltd is a leading global provider of semiconductor products, offering a comprehensive portfolio of CMOS Power Management and Real Time Clock ICs that enable engineers to design advanced applications for the consumer, industrial and automotive markets. The company's headquarter is based in Japan, as well as development, sales and manufacturing facilities. Regional sales and support offices are located in North America, Europe, and Asia.

Ricoh has an extensive expertise in small package technology and has a focus on developing products providing features such as low-supply current, high-accuracy, high efficiency and high-reliability. We obtained certificates for quality management (ISO9001:2015 and IATF16949:2016) and environmental management (ISO14001).

For further information, please visit [www.e-devices.ricoh.co.jp/en/](http://www.e-devices.ricoh.co.jp/en/).

### About Macnica Europe GmbH

Macnica's European headquarter was originally established in the UK in 2006, and moved to Germany in July 2008, to increase efficacy of its service for European customers.

By it's acquisition of the Munich based company Scantec Mikroelektronik in 2014 Macnica Europe formed a powerful semiconductor distribution with headquarters in Munich and Ingolstadt and numerous sales offices in Europe offering an attractive and competitive portfolio of highly sophisticated devices.

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Macnica provides end to end support from design-in to production through its global service network to its customers, regardless of the final destination of the product shipment to customers' manufacturing locations.

### **About Macnica, Inc.**

Macnica was established in 1972 as a semiconductor distribution company headquartered in Yokohama, Japan, and has over 65 sales offices worldwide in eastern Asia, Europe and the USA. Total number of employees is over 2,600 and its consolidated revenue for fiscal 2018 was approximately US\$ 5 B. Macnica is famous for having an excellent engineering team of more than 800 application support engineers, IC designers and software developers with strong focus on providing technical support for its customers including custom design services. Macnica is continuing to extend its presence globally by having successful partners in strategic areas in the electronics market.

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