Ricoh launches 4-Channel 42V Input Window Voltage Detector with Diagnostic Method

Campbell, CA, February 3, 2021 - Ricoh Electronic Devices Co., Ltd. in Japan has launched the R3500, a quadruple high-accuracy window voltage detector operating at a supply voltage up to 42V and intended for use in a wide variety of applications including automotive equipment. The chip consists of four channels, each with two detectors for overvoltage and undervoltage monitoring but also with built-in hysteresis that makes it less sensitive to supply voltage noise and ensures stable operation. An additional test pin enables a diagnostic method to verify the proper operation of the voltage detector periodically.

Conventional voltage detectors usually monitor the power supply of low voltage processors and share the same power source. In case of failure or slow start of this power source, the voltage detector will not operate or become unstable. The design of the R3500 has been enhanced and offers several important benefits:

1. The supply and the sense pins are separated, this makes the voltage detector more flexible to measure a voltage within the circuit and at a very low sense voltage level.
2. It has a wide operating voltage range, therefore it can be powered directly from car batteries and function independently from the power source for the processor.
3. A built-in voltage regulator makes the voltage detector's operation independent and stabilizes voltage fluctuations of a car battery, even during a tough cranking condition.
4. An additional MR pin makes it possible to periodically check the correct functioning of the monitoring circuit.
5. The sense voltage (Max. -1.25 to 0.75%) and hysteresis level (Typ. 0.5%) have a superior accuracy level, this is very suitable to fit into the MCU's operation voltage specifications including temperature deviations. A malfunction is detected in an early stage, this is especially important for safety critical applications and for automotive systems requiring fault detection including ECU, ADAS, control units including EV inverters and charge controllers.
6. A 4-channel voltage detector simplifies the routing of wires and reduces noise issues caused by multiple Vdd and Gnd wiring when using four single voltage detectors.

Conventional reset and window voltage detector ICs require costly external high-precision resistors to obtain a narrow sense voltage range. On the other hand, monitoring with an A/D Converter requires a sensitive resistance to ensure the precision and one cannot measure continuously for an anomaly detection. With the R3500 one obtains a high precision, continuous monitoring system according to the customers demand. Several product versions are available with internally set threshold voltage settings specified in 0.01 V increments. As for the output delay time, it can be specified by using an external capacitor connected to the Cd pin. In this way one can set the delay time long enough to reset the processor properly. The R3500 has an N-channel open drain output that needs a pull-up resistor to specify the logical high signal. The R3500 has a very robust design and has a secure pin layout as all pins have voltage rating of 20 V and the Vdd pin even up to 50 V (60 V < 200ms) to prevent damage of the chip when adjacent pins are shorted. The R3500 is available in four different quality grades targeting consumer, industrial and automotive markets (AEC-Q100 compliant soon).

R3500 Features (Consumer version):

Operating / Absolute Max. / Peak Voltage Range (<200 ms)	3.0 to 42 V / 50 V / 60 V
Operating Temperature Range	−40°C to 105°C
Supply Current	Typ. 10.0 µA
Overvoltage (OV) Detection	1.0 to 5.9 V (0.01 V steps)
Undervoltage (UV) Detection	0.9 to 5.0 V (0.01 V steps)
Detection Release Hysteresis	Max.0.75% (-40 to 105°C)
Over / Undervoltage Accuracy	± 0.5% (25°C); -1.25 to 0.75% (-40 to 105°C)
Detection Delay Time	Typ.20 µs
Release Time Delay	Typ. 4 ms (Cd = 0.01 µF)
Output Type	N-channel Open Drain
Package	HSOP-18 (5.2 x 6.2 x 1.45 mm)
Datasheet Consumer	https://www.n-redc.co.jp/en/pdf/datasheet/r3500-ea.pdf
Datasheet Automotive	https://www.n-redc.co.jp/en/pdf/datasheet/r3500-ec.pdf
Datasheet Industrial	https://www.n-redc.co.jp/en/pdf/datasheet/r3500-ey.pdf

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 companies 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.

For further information, please visit https://www.n-redc.co.jp/en/

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Headquartered in Tokyo, Ricoh Group operates in approximately 200 countries and regions. In the financial

year ended March 2020, Ricoh Group had worldwide sales of 2,008 billion yen (approx. 18.5 billion USD).

For further information, please visit **www.ricoh.com**

For further information: RICOH Americas Holding, Inc., Electronic Devices Division, Tel: (408) 610-3105, Email: edd@ricoh-usa.com

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