Ricoh launches 42V Input Window Voltage Detector with Diagnostic Method

Osaka, Japan, October 8, 2020 - Ricoh Electronic Devices Co., Ltd. in Japan has launched the R3154, a 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 two detectors for overvoltage and undervoltage monitoring, each 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 R3154 has been enhanced and offers several important benefits:

1. The supply and the measuring 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 test 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.

Conventional reset and window voltage detector ICs require costly 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 R3154 one obtains a high precision, continuous monitoring system according to the customers demand. Several product versions are available with internally set threshold voltage settings. These are specified in 0.01 V increments and an active reset time can be set by adding an external capacitor, the output is an N-channel open drain version.

The R3154 is available in four different quality grades targeting consumer, industrial and automotive markets (AEC-Q100 compliant soon). The robust SOT-23-6 package has pins with a high withstand voltage to prevent damage to the chip in the event of a short circuit between adjacent pins.

R3154 Features:

Operating / Absolute Max. / Peak Voltage Range (<200 ms)	3.0 to 42 V / 50 V / 60 V
Supply Current	Typ. 2.0 µA
Overvoltage (OV) Detection	0.75 to 3.7 V (0.01 V steps)
Undervoltage (UV) Detection	0.55 to 3.3 V (0.01 V steps)
Over / Undervoltage Accuracy	± 0.5% (25°C); -1.25 to 0.75% (-40 to 125°C)
Detection Release Hysteresis	Typ.0.5%
Release Time Delay	Typ. 4 ms (Cd = 0.01 µF)
Output Type	N-channel Open Drain
Operating Temperature Range (Consumer / Industrial + Automotive)	-40 to 105°C / -40 to 125°C
Package	SOT-23-6 (2.9 x 2.8 x 1.1 mm)

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.

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