
R8C/38T-A Group

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Water film effect on a cap touch key

May 21, 2013

Summary

Touch panel microcomputer R8C/33T group builds hardware (SCU: sensor control unit) that perceives the contact of the human body by measuring the stray capacity generated between the touch electrode and the human body into.

In this application note, we provide the influence on the touch sensibility when a water film is formed on a surface of touch panel.

Target device

R8C/33T, R8C/3JT, R8C/3NT, R8C/36T-A and R8C/38T-A group

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1. Water film effect on a touch key

1.1 Outline

The touch microcomputer of the R8C/33T group measures the floating capacitance of the touch electrode connected to the measurement terminal, so the measurement is affected by a touch electrode and the parasitic capacitance. SCU detects capacitance increase by the human touch and distinguishes the touch. However, SCU detects a touch like a human touch when a water film is formed on an electrode. Because floating capacitance increases by the high dielectric material such as the water. (Refer to Figure 1-1- 1)

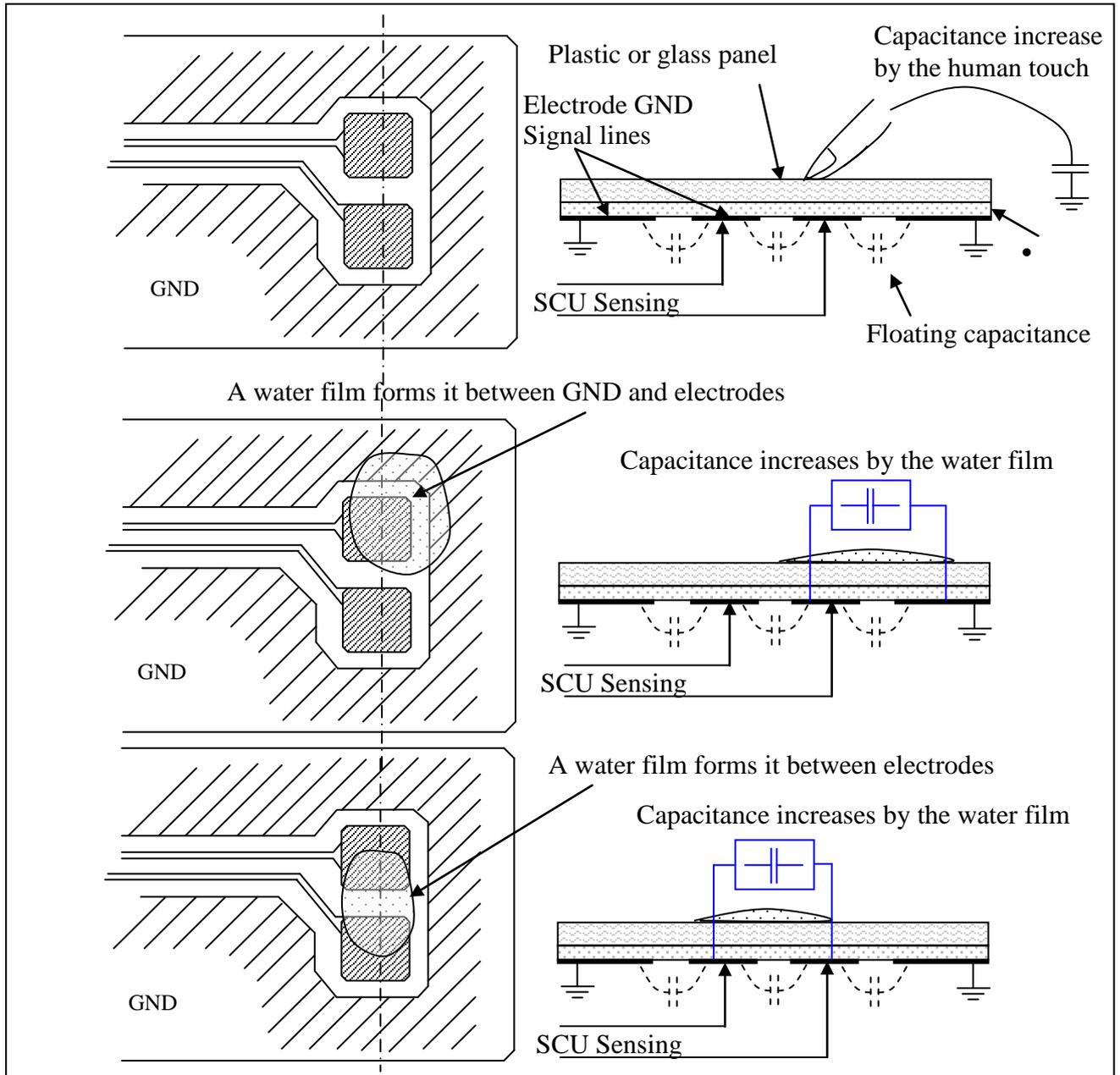


Figure 1-1- 1 A touch false judgment by the water film

2. Reduction of the water film influence

2.1 Simultaneous touch cancellation

We show a method that the prevention of the false judgment by the water film between the electrode as follows.

SCU detects a change of the capacitance every each CH in the touch sensing of the R8C/33T group.

Therefore SCU detects the capacitance change of each electrode when a water film was formed between electrodes.

"Simultaneous touch cancellation" algorithm is effective for prevention of false judgment with the case which detected the change that is similar to the "touch" recognition of plural electrodes in this way.

The "Simultaneous touch cancellation" algorithm can apply to every electrode group.

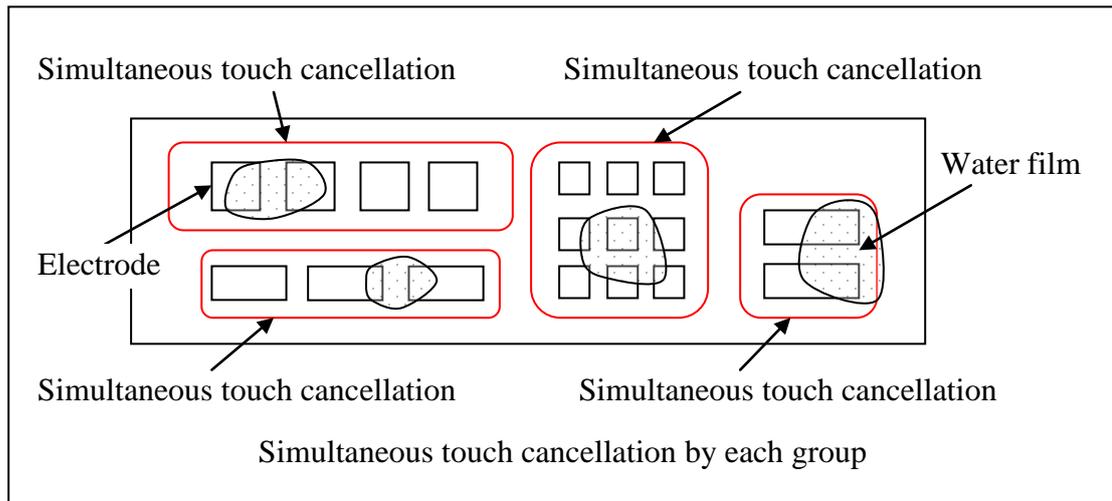


Figure 2-1- 1 the prevention example of the false judgment by the water film which used "Simultaneous touch cancellation"

For more information about "Simultaneous touch cancellation", please refer to application note

" R8C/33T Group S/W Driver for Touch Sensor REJ05B1342-0100".

2.2 A dummy electrode

When a water film is formed between an electrode and GND, unfortunately prevention of false judgment in "Simultaneous touch cancellation" cannot function.

The reduction of the false judgment by the water film is possible by using "Simultaneous touch cancellation" with a dummy electrode like a Figure 2-2- 1

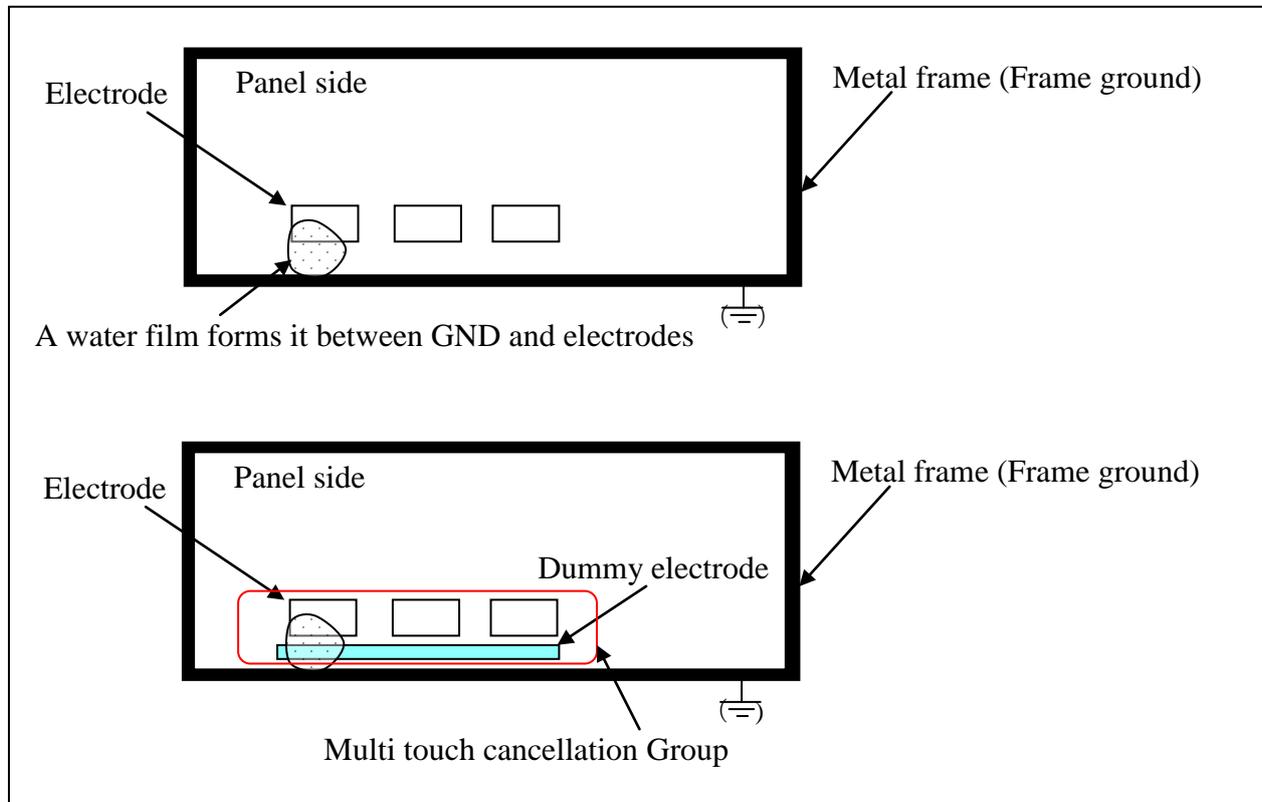


Figure 2-2- 1 A reduction method of the influence by the water film between the electrodes to GND

2.3 Threshold and drift correction interval

When a water film is not left on the panel by a configuration and use environment (For example, "It is hard to form a water film", "Water flows on the panel side and it falls. ")

It is possible to reduce the influence by the following adjustments.

1. Threshold setting (Threshold setting in consideration of change by influence of water)
2. Drift correction interval (The reference value is quickly updated to the change by the influence of water.).

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Change record

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General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.

- The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable.

When switching the clock signal during program execution, wait until the target clock signal has stabilized.

- When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.

- The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

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