

Attention: Digi-Key Corporation

Handling Notice of MAUS74S / MRUS74X

Dear. Valued Customer

Thank you very much for your great and continued support for business with Murata.

This is the notification to ask you for the proper use of our Product, Part Number: MRUS74S / MRUS74X ("MRUS74 Series", hereunder), as we had a case, in which MRUS74X output becomes unstable when it is used at one of our customers.

This event possibly happens in any customers who use or evaluate MRUS74 Series. So, whenever you design or evaluate MRUS74 Series, please kindly check your circuit. If two MRUS74 Series are connected in parallel to the same port of microcomputer (Chart 1 of Chapter 3 in this document), please change it 1 sensor – 1 port connection (Chart 2 of Chapter 3.)

Your understanding and support are highly appreciated.

1. Event

Outputs become unstable.

(MRUS74 Series output signal as High, regardless of its condition is High or Low.)

*Please kindly check wave form with oscilloscope up to 2 μ S from enable impressing.

**This event may occur at particular temperature, but Temperature range is various, depending on the sensors combination.

(For example, this event breaks out at -10 ~ +5 degree in some MRUS74 Series.)

2. Cause

When two or more MRUS74 Series are connected in parallel to the same port of microcomputer, these situations may occur, which lead to the Event happen.

- Noises appear in enable wave form
- Microcomputer drive capability becomes insufficient

(This event mostly occurs at the first 1 to 2 μ S of power distribution to MR element, when enable voltage is decreasing.)

*The Event does not occur when each sensor is connected to one port of microcomputer by its own, in which microcomputer drive capability is enough.

(Please kindly check catalog spec of microcomputer, and voltage depression of enable waveform.)

3. Details

3-1. Circuit Connection Example

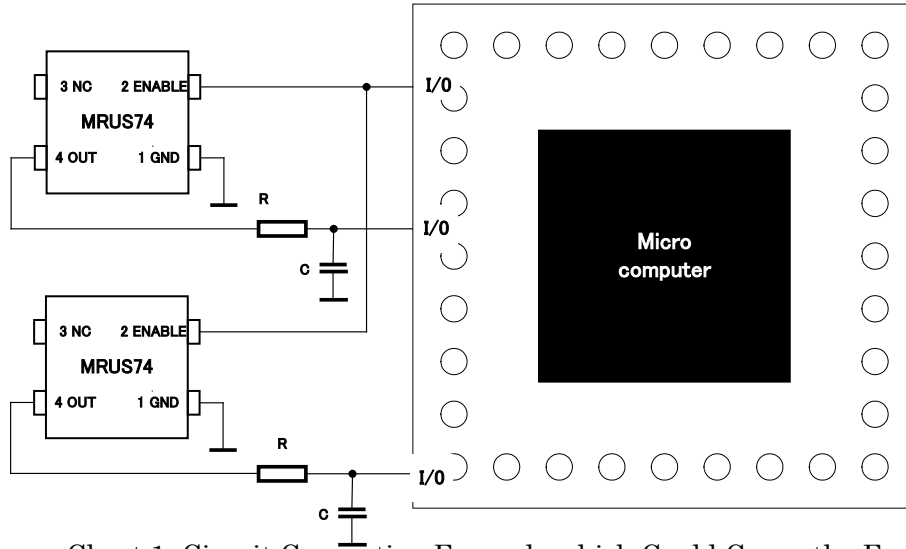


Chart 1. Circuit Connection Example which Could Cause the Event.

(Two MRUS74 Series are connected in parallel to the same port of microcomputer.)

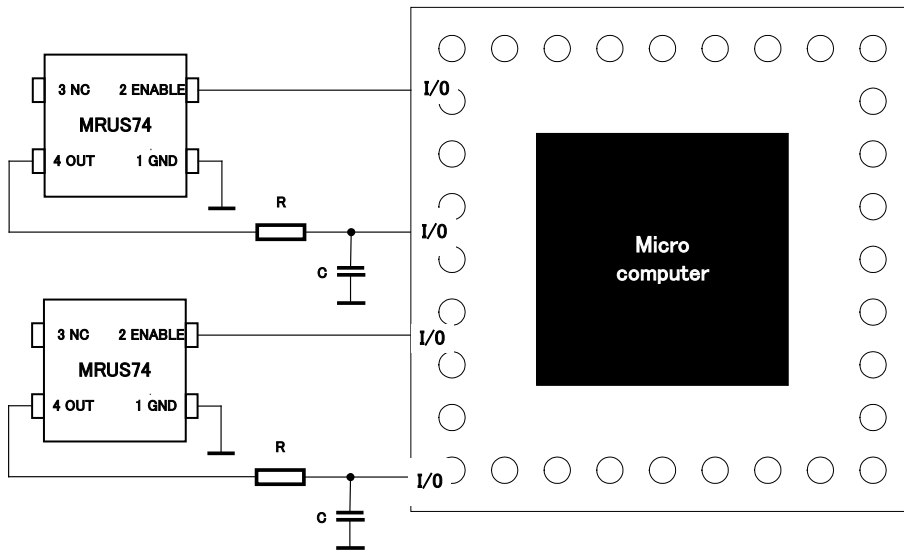


Chart 2. Recommended Circuit Connection

(Each MRUS74 Series is connected to the different port of microcomputer.)

*Circuit connection shown in Chart 1 is not recommended, so please change it to as Chart2.

3-2 Event Example (Wave Form of Oscilloscope)

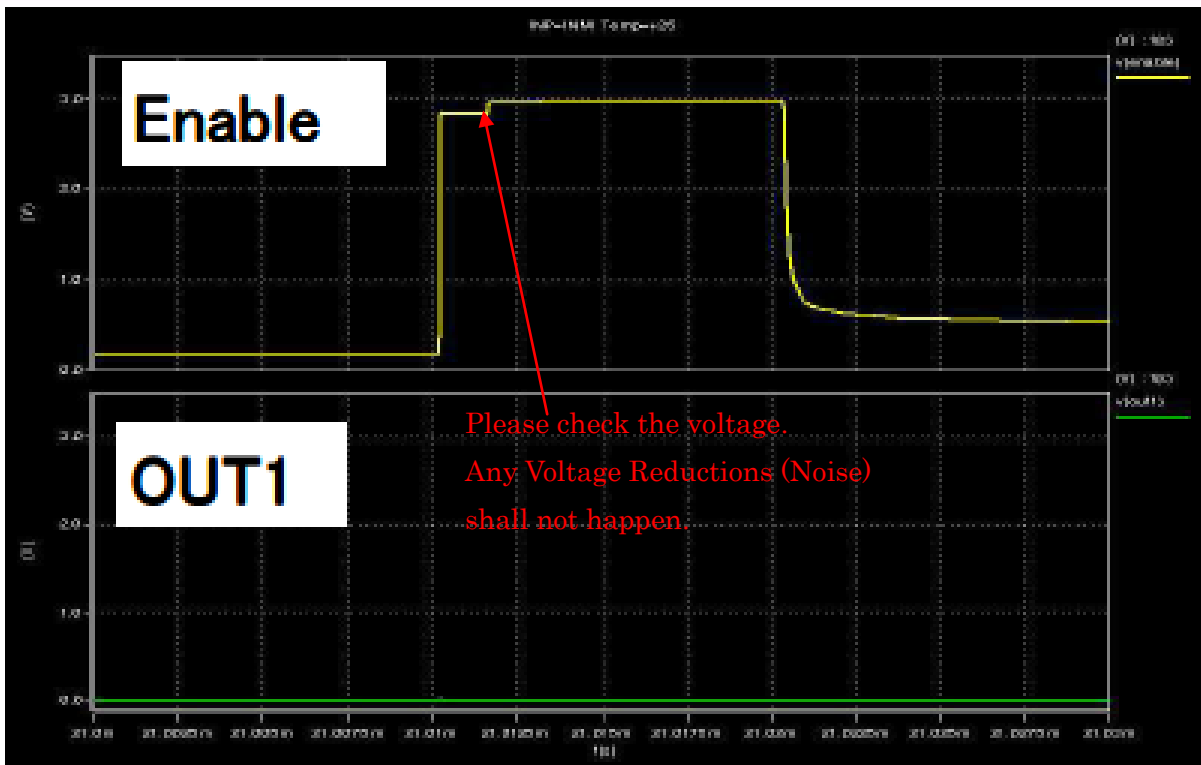


Chart3. Enable wave form at Low Condition and OUT1 Situation (Correct Operation)

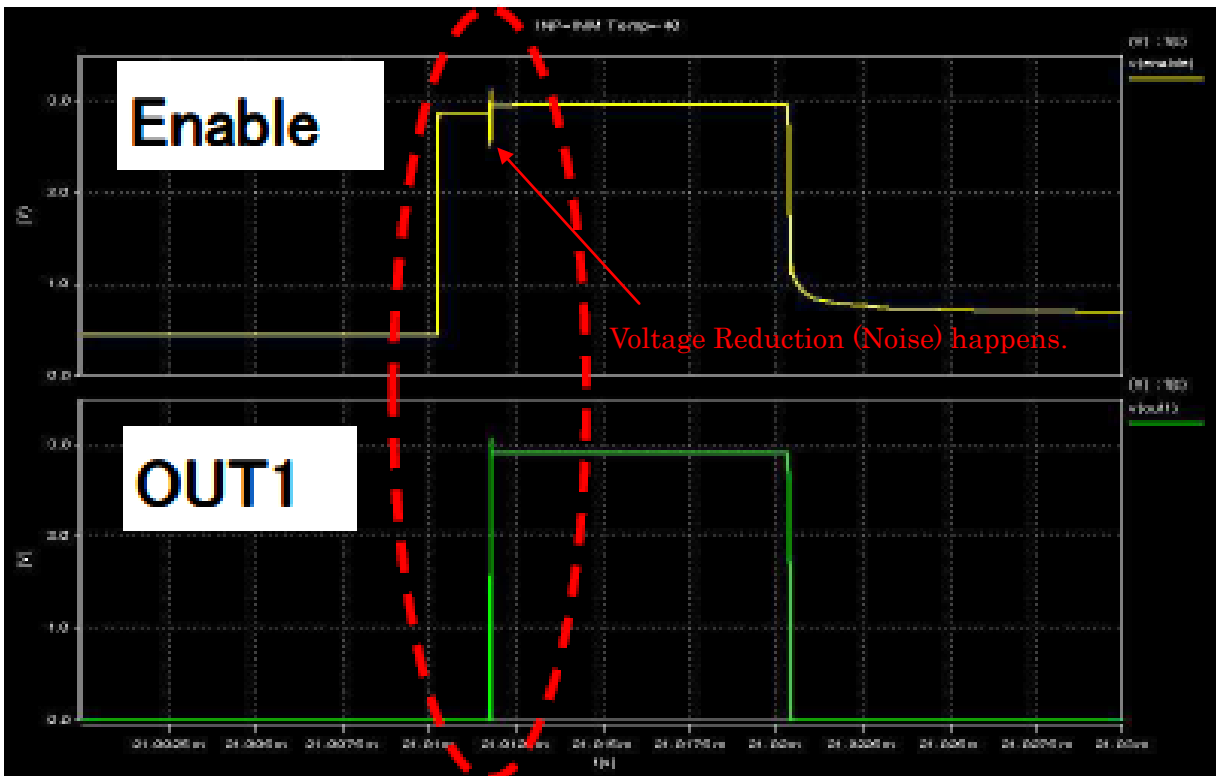


Chart 4. Enable Wave Form at Low Condition and OUT 1 Situation (Incorrect Operation)

*Both Chart 3 and Chart 4 are in the same magnetic field condition, but wave form in Chart4 may occur at particular temperature.

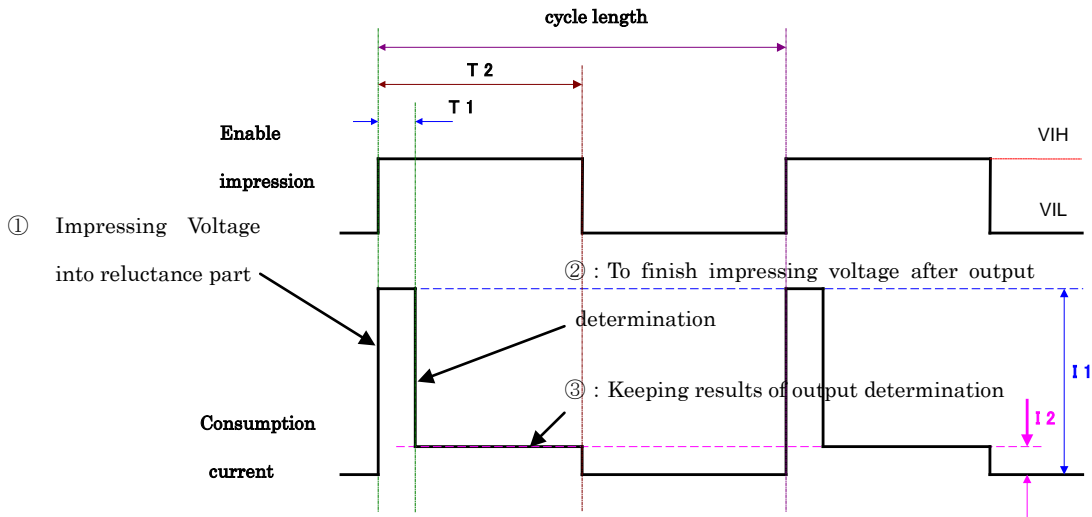
**Same enable noises and OUT1 wave form defect may also happen in High condition.

3-3. Importance of Enable Wave Form and Protection against Noise

The stability of enable wave form is very important to MRUS74 Series. If evaluation is not properly proceeded, erroneous decision can happen. So, please evaluate it by checking wave form with oscilloscope.

Preparing electrode PAD on board to monitor enable and output is recommended.

- Relationship between Enable Wave Form and Consumption Current



T1: Impressing Time to Reluctance Part (approximately $1.5 \mu S$)

Pressure rises in about $0.5 \mu S$, and IC determines High or Low in about $1.5 \mu S$.

T2: Pulse Width (Microcomputer Configuration)

- Motion of MRUS74 Series

Enable Voltage

- ① Enable must rise up to 90% of enable voltage in $0.5 \mu S$ after enable is impressed.
- ② After enable is rose up, IC determines output and finishes impressing voltage into reluctance part.
- ③ T2 is necessary time to determine High/Low result, which configured by microcomputer. For appropriate T2, please refer to the spec of microcomputer.

Consumption Current

- ① MRUS74 Series consumes current a lot when it impresses voltage to reluctance part. (3V: Max I1 is 2.5mA)
- ② When its output is determined, voltage is supplied to reluctance part. Each gate operates in that situation, so sensor will consume more current.
- ③ Sensor finishes supplying voltage to reluctance part after output determination. It only latches results of High or Low, so I2 will drop to 0.3mA.

- Notice

- ① Please make an attention to voltage change during impressing voltage to reluctance part.
MRUS74 Series can improperly determinate if voltage drops to less than necessary amount to monitor IC.
- ② When enable is unstable at output determination phase, MRUS74 Series could make wrong judge. So, please take care of voltage depression and noise.
(Please check the driving capability of microcomputer. If that capability is not enough, please take some correcting actions, such as FET use.)
For noises, when two or more MRUS74 Series are used with small capability microcomputer, voltage variation of one sensor may affect to others.

4. Contact

If you have any concerns about this event, please kindly contact to sales person or Sensor Product Department.

Truly Yours, Thank you.

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