

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU	Document No.	TN-RX*-A0284A/E	Rev.	1.00
Title	CTSU Capacitance reduction characteristics due to power supply ripple noise		Information Category	Technical Notification	
Applicable Product	RX130 Group	Lot No.	Reference Document	RX130 Group User's Manual Hardware Rev.3.00 (R01UH0560EJ0300)	
		All			

## 1. Phenomenon

When ripple noise is superimposed on the VCC power supply, if the ripple noise is superimposed in the frequency band where the control current decreases, the measured value of the capacitance connected to the TSm terminal decreases. This characteristic is presented as a reference value, so please take note of it when designing the external power supply circuit that supplies power to the VCC power supply.

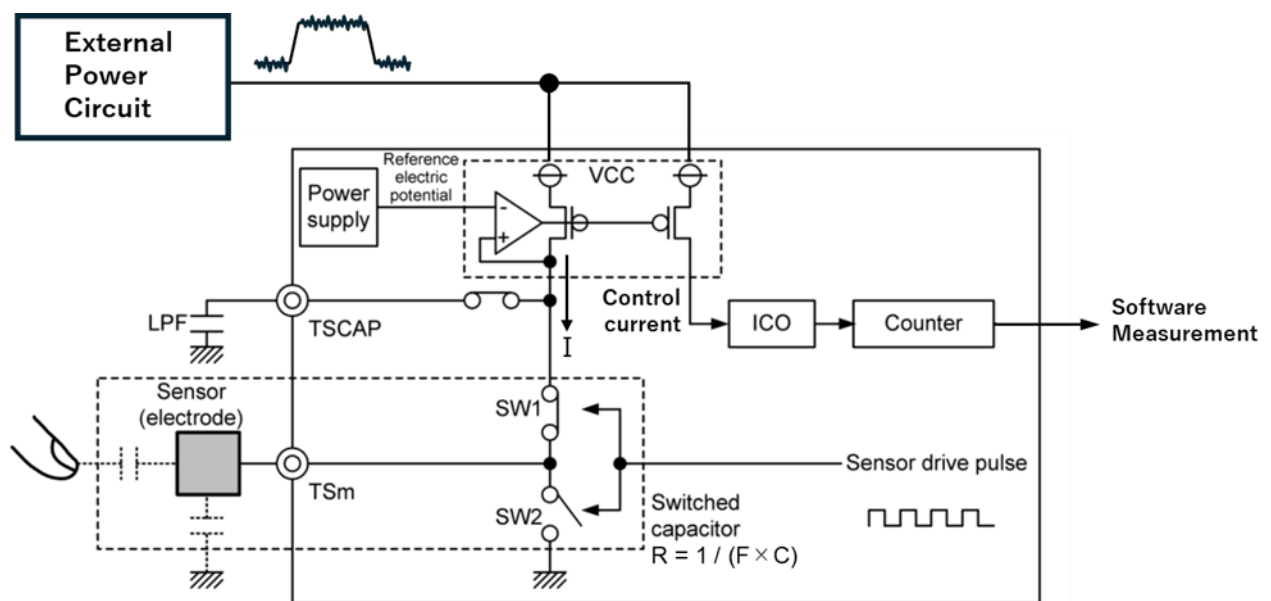


Figure 1 Measurement circuit

For the calculation method of the measured capacitance value of the CTSU when ripple noise is superimposed, please refer to "Capacitive Touch Ripple Countermeasures Guide (R30AN0453)" 3.4 Touch Parameter Adjustment (1) RX130 Capacitance Measurement Value Conversion Formula.

2. Addition characteristic data

Table 1 CTSU Measured capacitance reduction characteristics due to VCC power supply ripple noise (reference value)

Conditions:  $2.4V \leq VCC \leq 5.5V$ ,  $VSS = 0V$ ,  $Ta = -40$  to  $+105^{\circ}C$ ,  $Cp = 20pF$

Item		Symbol	min	typ	max	Unit	Test Conditions (Ripple noise amplitude)
Measured capacitance reduction characteristics (Notes 1, 2, 3)	Ripple Noise Frequency < 20kHz	$C_{down}$	—	—	0.01	pF	100mVpp
	20kHz ≤ Ripple Noise Frequency ≤ 2MHz		—	—	0.20		30mVpp
			—	—	0.43		50mVpp
			—	—	0.96		100mVpp
	2MHz < Ripple Noise Frequency		—	—	0.03		100mVpp

Note 1. This is the value when CTSUATUNE1=0 is set.

Note 2. The target value for offset adjustment is 37.5%. For an overview of offset adjustment, refer to "2. Capacitance Detection" and "7.1 Automatic Tuning Using QE for Capacitive Touch" in the Application Note Capacitive Sensor MCU Capacitive Touch Introduction Guide (R30AN0424).

Note 3. This is the value when using the Self-capacitance method.

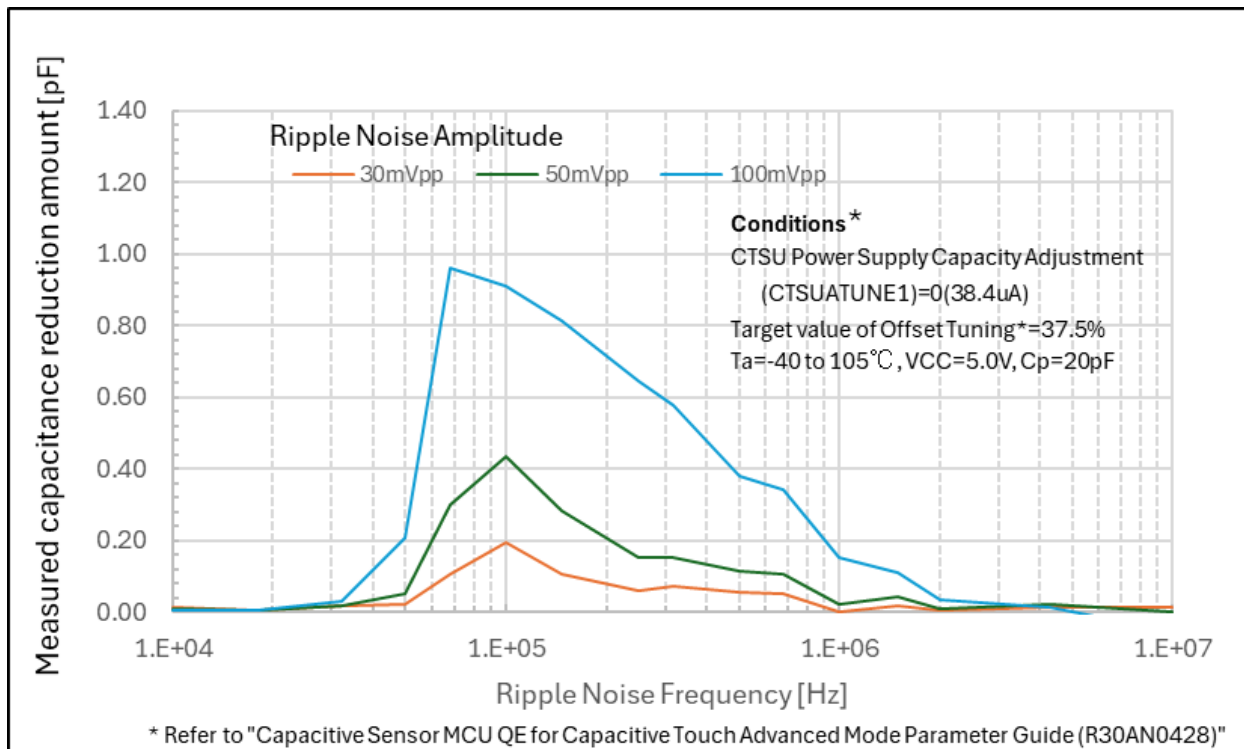


Figure 2 Measured capacitance reduction amount