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Renesas Electronics Corporation

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H8/38076R

Power-On Reset Circuit

Introduction

This example describes the usage of the internal power-on reset circuit of the H8/38076R.

Target Device

H8/38076R

Contents

1. Specifications

- An internal reset signal is generated at power-on by connecting a capacitor to the $\overline{\text{RES}}$ pin of the H8/38076R.
- An example of usage of the internal power-on reset circuit is illustrated in figure 1.

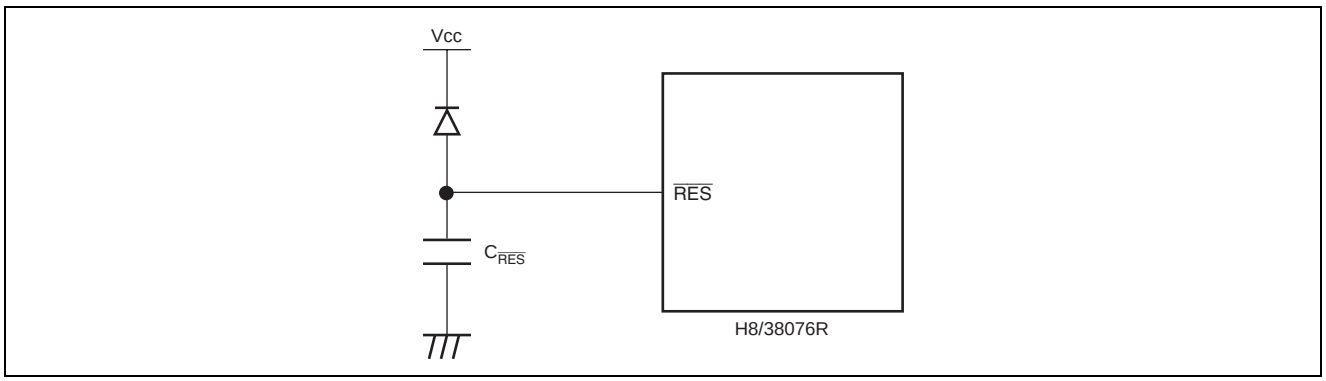

Figure 1 Usage Example of Power-On Reset Circuit

2. Functions Used

2.1 Functions

The functions of the H8/38076R used in this sample task are described below.

- Power-On Reset Circuit
  An internal reset signal is generated at power-on by connecting an external capacitor. A block diagram of the power-on reset circuit is shown in figure 2.

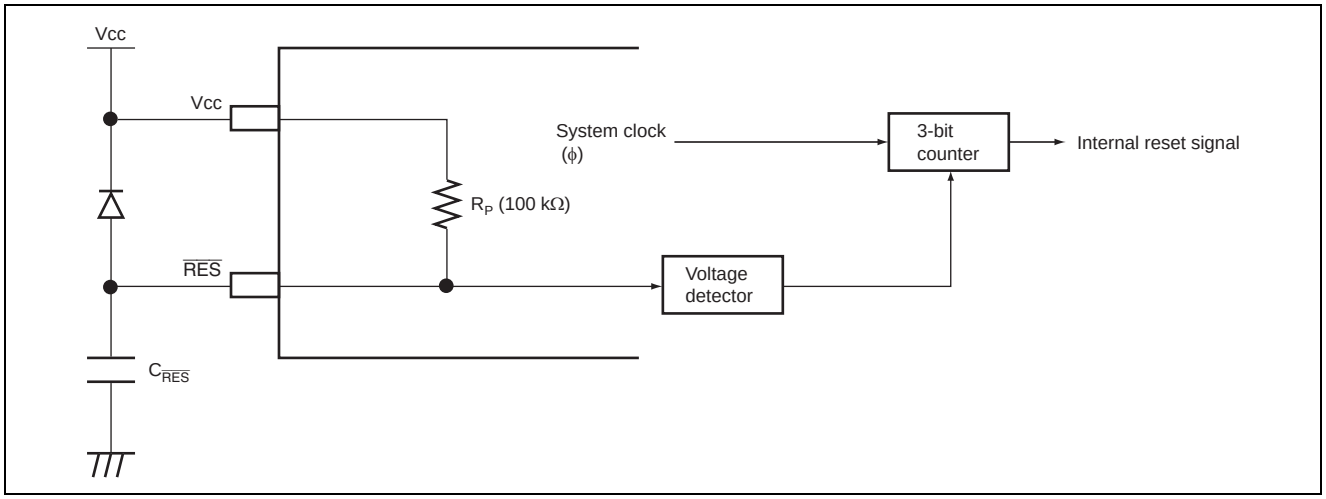

Figure 2 Block Diagram of Power-On Reset Circuit

The operation timing of the power-on reset circuit is shown in figure 3.

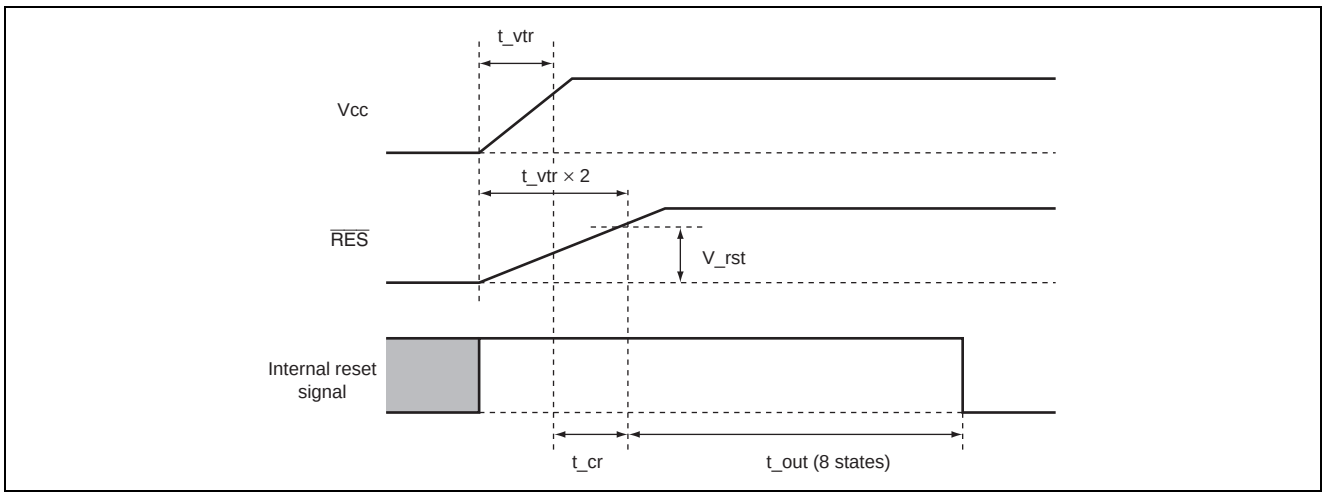

Figure 3 Operation Timing of Power-On Reset Circuit

As the power supply voltage (V_{CC}) rises, the external capacitor connected to the $\overline{RES}$ pin, is gradually charged through the internal pull-up resistor (100 kΩ). Until the level of the $\overline{RES}$ pin rises to the predetermined level, a low-level $\overline{RES}$ signal is transferred internally and the entire device is reset. When the level of the $\overline{RES}$ signal reaches the predetermined level, the voltage detection circuit detects it and a 3-bit counter starts counting up. The 3-bit counter counts ϕ for 8 states, at which point an overflow signal is generated and the internal reset signal is cleared.

An internal noise cancellation circuit operates for approximately 100 ns to prevent the device from malfunctioning due to noise on the $\overline{RES}$ signal.

The capacitance ($C_{\overline{RES}}$) connected to the $\overline{RES}$ pin can be computed using the following formula, where the power supply rise time (t_vtr) is 5 ms and the $\overline{RES}$ signal rise time (t_vtr × 2)* is 10 ms. A value of 100 kΩ should be used for the internal pull-up resistor when making the calculation.

*: Adjust the capacitance connected to the $\overline{RES}$ pin so that (t_vtr × 2) exceeds the oscillation stabilization time.

$$C_{\overline{RES}} = 10\ ms/100\ k\Omega = 0.1\ \mu F$$

Make sure the power supply voltage (V_{CC}) falls to or below Vpor = 100 mV and then rises after the charge on the $\overline{RES}$ pin has been removed. It is recommended that a diode be placed on the V_{CC} side to remove the charge on the $\overline{RES}$ pin. If the power supply voltage (V_{CC}) rises above Vpor, power-on reset may not occur.

The characteristics of the power-on reset circuit are listed in table 1.

Table 1 Power-On Reset Circuit Characteristics

(V_{CC} = 1.8 V to 3.6 V, AV_{CC} = 1.8 V to 3.6 V, V_{SS} = AV_{SS} = 0.0 V, Ta = −20 to +75°C (regular specifications), Ta = −40 to +85°C (wide temperature range specifications), unless otherwise specified.)

			Value			
Item	**Symbol**	**Test Condition**	**min.**	**typ.**	**max.**	**Unit**
Reset voltage	V_rst		0.7Vcc	0.8Vcc	0.9Vcc	V
Power supply rise time	t_vtr		The V_{CC} rise time should be at least twice as fast as the $\overline{RES}$ pin rise time.			
Reset count time	t_out		0.8	—	4.0	µs
Count start time	t_cr		Adjustable by the value of the external capacitor connected to the $\overline{RES}$ pin.			
Internal pull-up resistance	R_P	Vcc = 3.0 V	60	100	—	kΩ

Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Mar.18.05	—	First edition issued

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