

# RNA50C27AUS

## CMOS System-Reset IC

REJ03D0834-0100

Preliminary

Rev.1.00

Apr 10, 2006

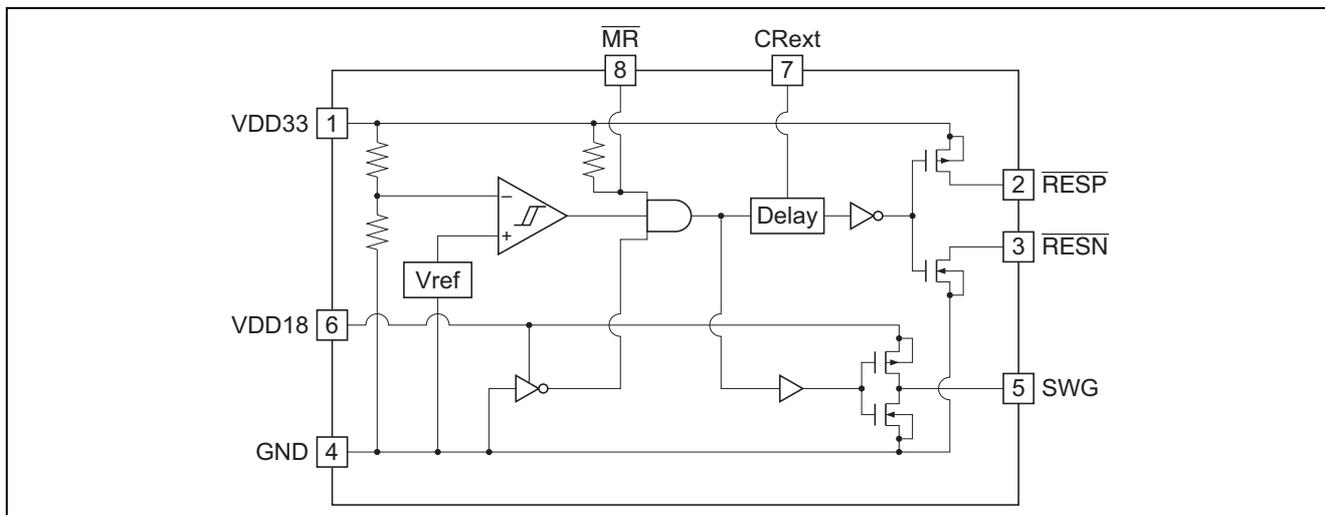
### Description

This IC facilitates complicated power-on and power-monitoring resets of microcomputers that require the 3.3-V and 1.8-V dual power supplies. It also facilitates change of delay time of reset signal by externally setting resistance and capacity for delay time. By employing complementary open-drain output, desired output such as open-drain output and CMOS output can be obtained.

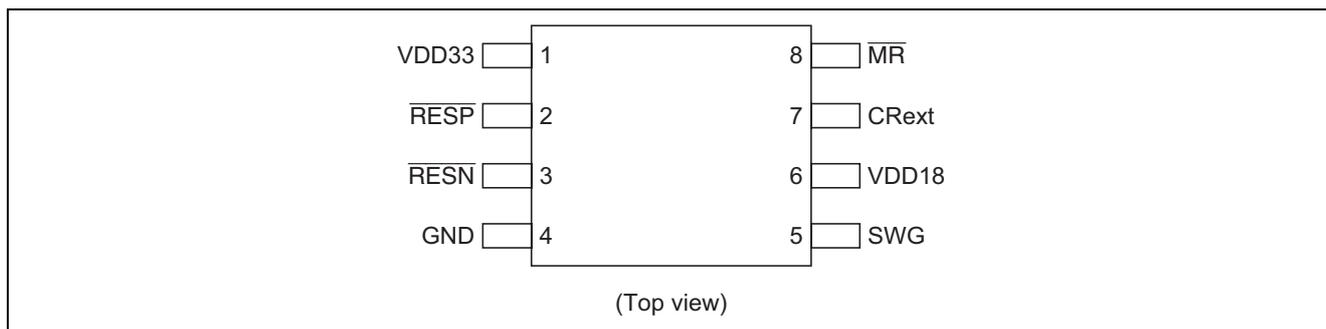
### Functions

- 3.3-V detection voltage : 2.7 V
- Accuracy of 3.3-V detection voltage :  $\pm 1.0\%$
- Hysteresis of 3.3-V detection voltage : 5% Typ.
- Open-drain/CMOS output
- 1.8-V PMOS drive output
- Ultra-small SSOP-8 package

### Block Diagram



## Pin Arrangement



## Pin Description

Pin No.	Pin Name	Function
1	VDD33	Input power supply pin for 3.3-V voltage. Recommended operating range is 2.7 to 3.6 V. Set the input voltage to 0.033 V/ $\mu$ s or less when starting up.
2	$\overline{\text{RESP}}$	Active-low reset signal output pin. By connecting to RESN pin, CMOS output can be used. If using open-drain, please connect pull-down resistor.
3	$\overline{\text{RESN}}$	Active-low reset signal output pin. By connecting to RESP pin, CMOS output can be used. If using open-drain, please connect pull-up resistor.
4	GND	GND pin
5	SWG	External PMOS gate control signal to be set between 1.8-V power supply and 1.8-V voltage input of microcomputer.
6	VDD18	Input power supply pin for 1.8-V voltage. Recommended operating range is 1.65 to 3.6 V.
7	CRext	Connecting pin for Rext resistance and Cext capacity that determine the delay time of reset signal. 3.3 k $\Omega$ or more is recommended for resistance. The delay time, $t_{\text{DLY}}$ , is given by the following formula. $t_{\text{DLY}} = \text{Cext} \times \text{Rext} [\text{s}]$
8	$\overline{\text{MR}}$	Pin to provide reset manually. MR pin is pulled-up to VDD33 through internal resistor.

## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	VDD33	4.6	V
	VDD18	4.6	
Input voltage	$V_I$	-0.3 to VDD33+0.3	V
Output voltage	$V_O$	-0.3 to VDD33+0.3	V
Input current	$I_I$	20	mA
Output current	$I_O$	25	mA
Supply current	$I_{DD}$	25	mA
Power dissipation	$P_T$	273	mW
Storage temperature	Tstg	-55 to +125	°C

## Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Remarks
Supply voltage	VDD33	VTH33	—	3.6	V	
	VDD18	1.65	—	VDD33		
Input voltage	$V_{MR}$	0	—	VDD33	V	
Output voltage	$V_O$	0	—	VDD33	V	
	$V_{OSWG}$	0	—	VDD18		
External resistor	Rext	3.3	—	—	k $\Omega$	VDD33 = 3.3 V
External capacitor	Cext	—	No limit	—		
Drivable capacitor	$C_L$	—	2200	—	pF	SWG output
Operating temperature	Ta	-40	—	85	°C	

## Electrical Characteristics

### DC Characteristics

(VDD33 = 3.3 V, VDD18 = 1.8 V, Ta = 25°C, C<sub>Rext</sub>:R = 10 kΩ)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent supply current		IDD33	0.75	1.5	4	μA	All outputs are open
		IDD18	0.25	0.5	2		
Detection voltage		VTH33	Typ×0.99	2.7	Typ×1.01	V	
		VTH <sub>H</sub>	1.2	—	—		
		VTH <sub>L</sub>	—	—	0.55		
Detection voltage temperature dependency		$\frac{\Delta V_{th33}}{V_{th} \cdot \Delta T_a}$	—	±100	—	ppm/°C	
Detection voltage hysteresis		V <sub>HYS</sub>	VTH33×3%	VTH33×5%	VTH33×8%	V	
MR	Low-level input voltage	V <sub>IL</sub>	—	—	VTH33×0.25	V	
	High-level input voltage	V <sub>IH</sub>	VTH33×0.75	—	—	V	
	internal pull-up resistance	R <sub>MR</sub>	—	T.B.D.	—	kΩ	
CMOS *1	Low-level output current	I <sub>OL</sub>	7.5	15	30	mA	V <sub>O</sub> = 0.5 V
	High-level output current	I <sub>OH</sub>	5	10	20		V <sub>O</sub> = VDD33 – 0.5 V
RESP	Output leakage current	I <sub>LEAK</sub>	—	—	0.1	μA	RESN off
RESN	Output leakage current	I <sub>LEAK</sub>	—	—	0.1	μA	RESP off
SWG	High-level output voltage	V <sub>OH</sub>	1.7	—	—	V	V <sub>O</sub> = open
	Output source current	I <sub>OH</sub>	1.5	3	6	mA	V <sub>O</sub> = VDD33 – 0.5 V
	Low-level output voltage	V <sub>OL</sub>	—	—	0.1	V	V <sub>O</sub> = open
	Output sink current	I <sub>OL</sub>	0.2	0.35	0.55	mA	V <sub>O</sub> = 0.5 V

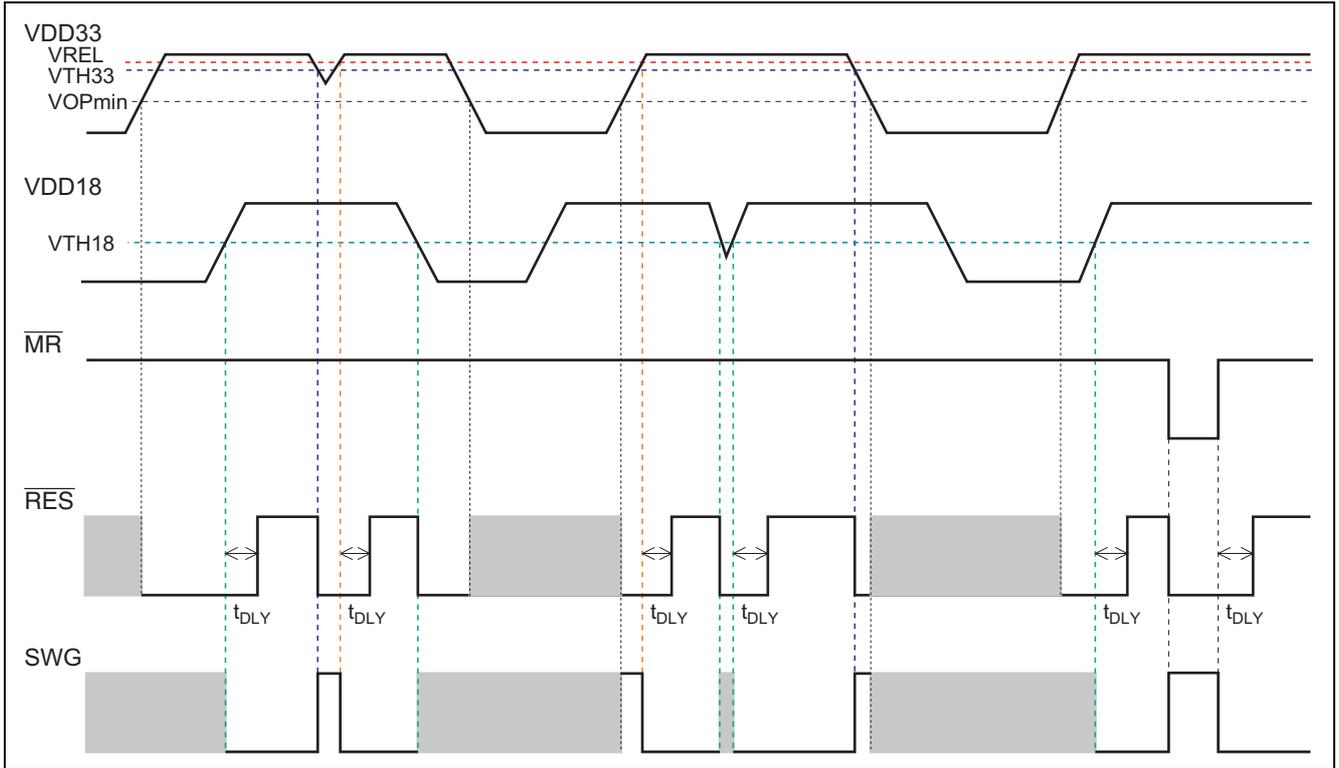
Note: When the voltage within  $V_{IL} < V_{IN} < V_{IH}$  is applied to MR and VDD18 input by DC, oscillation may occur.

1. When RESP output and RESN short out and CMOS output is used.

### AC Characteristics

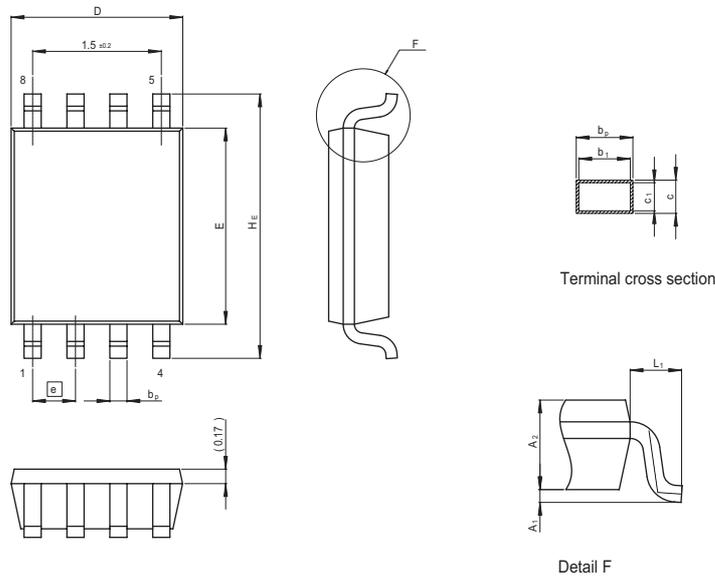
Item		Symbol	Min	Typ	Max	Unit	Test Conditions
RESP	Propagation delay time	t <sub>PLH</sub>	—	50	400	μs	C <sub>L</sub> = 15 pF, C <sub>Rext</sub> :C = open
		t <sub>PHL</sub>	—	5	T.B.D.		
	Response time	t <sub>r</sub>	—	5	T.B.D.	ns	
		t <sub>f</sub>	—	5	T.B.D.	μs	
RESN	Propagation delay time	t <sub>PLH</sub>	—	50	400	μs	C <sub>L</sub> = 15 pF, C <sub>Rext</sub> :C = open
		t <sub>PHL</sub>	—	1.5	T.B.D.		
	Response time	t <sub>r</sub>	—	5	T.B.D.	μs	
		t <sub>f</sub>	—	5	T.B.D.	ns	
SWG	Propagation delay time	t <sub>PLH</sub>	—	50	400	μs	C <sub>L</sub> = 2200 pF
		t <sub>PHL</sub>	T.B.D.	1.5	T.B.D.		
	Response time	t <sub>r</sub>	T.B.D.	1.0	T.B.D.	μs	
		t <sub>f</sub>	T.B.D.	7.6	T.B.D.		
Delay time		t <sub>DLY</sub>	—	93	—	ms	C <sub>Rext</sub> :C = 0.1 μF, R = 1 MΩ

### Timing Chart



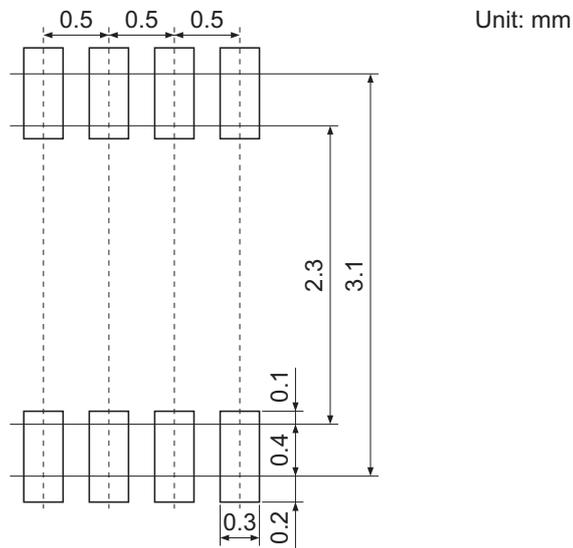
### Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-VSSOP8-2.3x2-0.50	PVSP0008KA-A	TTP-8DB/TTP-8DBV	0.010g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	1.8	2.0	2.2
E	2.2	2.3	2.4
A <sub>2</sub>	0.6	0.7	0.8
A <sub>1</sub>	0	—	0.1
A	—	—	—
b <sub>p</sub>	0.15	0.22	0.3
b <sub>1</sub>	—	0.20	—
c	0.08	0.13	0.23
c <sub>1</sub>	—	0.11	—
θ	—	—	—
H <sub>E</sub>	2.8	3.1	3.4
Ⓜ	—	(0.5)	—
x	—	—	—
y	—	—	—
Z	—	—	—
L	—	—	—
L <sub>1</sub>	—	(0.4)	—

### Footprint



SSOP-8 Footprint Example

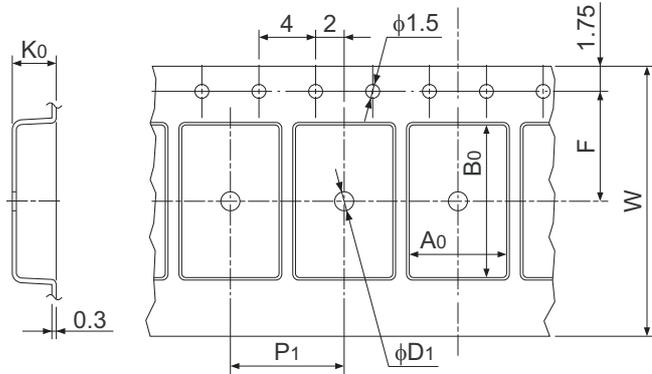
Note: These numbers on the diagram are reference values.  
Please adjust size, space, and other area of footprint as needed.

### Taping and Reel Specifications

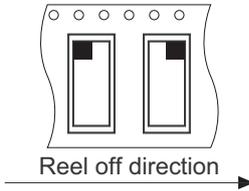
[Taping]

Unit: mm

W	P <sub>1</sub>	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	F	D <sub>1</sub>	Maximum Storage No.	Reel Type	Packing Form
8	4	2.25	3.4	1.0	3.5	1.05	3,000 IC/Reel	C	Non dry pack



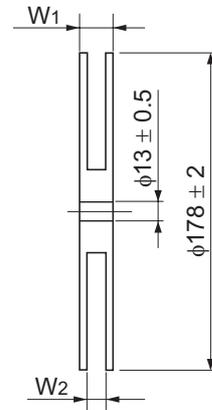
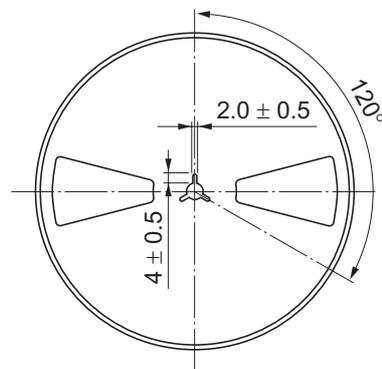
The pin1 is located in the hatching portion



[Reel]

Tape width: W	W <sub>1</sub>	W <sub>2</sub>
8	13.0	9.0

Reel type: C



**Keep safety first in your circuit designs!**

1. Renesas Technology Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.  
Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

**Notes regarding these materials**

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corp. product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corp. or a third party.
  2. Renesas Technology Corp. assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
  3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corp. without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor for the latest product information before purchasing a product listed herein.  
The information described here may contain technical inaccuracies or typographical errors.  
Renesas Technology Corp. assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.  
Please also pay attention to information published by Renesas Technology Corp. by various means, including the Renesas Technology Corp. Semiconductor home page (<http://www.renesas.com>).
  4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corp. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
  5. Renesas Technology Corp. semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
  6. The prior written approval of Renesas Technology Corp. is necessary to reprint or reproduce in whole or in part these materials.
  7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.  
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
  8. Please contact Renesas Technology Corp. for further details on these materials or the products contained therein.
- 



**RENESAS SALES OFFICES**

<http://www.renesas.com>

Refer to "<http://www.renesas.com/en/network>" for the latest and detailed information.

**Renesas Technology America, Inc.**

450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

**Renesas Technology Hong Kong Ltd.**

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2730-6071

**Renesas Technology Taiwan Co., Ltd.**

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

**Renesas Technology Singapore Pte. Ltd.**

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510