

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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Not recommended  
for new design

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# M51981ML/SL

## Voltage Detecting, System Resetting IC Series

REJ03D0779-0400  
Rev.4.00  
Sep 18, 2007

### Description

M51981ML/SL are semiconductor integrated circuits designed for detecting supply voltage and resetting all types of logic circuits such as CPUs.

They find extensive applications, including battery checking circuit, level detecting circuit and waveform shaping circuit.

### Features

- Few external parts
- Low threshold operating voltage (Supply voltage to keep low-state at low supply voltage): 0.6 V (Typ) at  $R_L = 22\text{ k}\Omega$
- Wide supply voltage range: 2 V to 17 V
- Wide application range

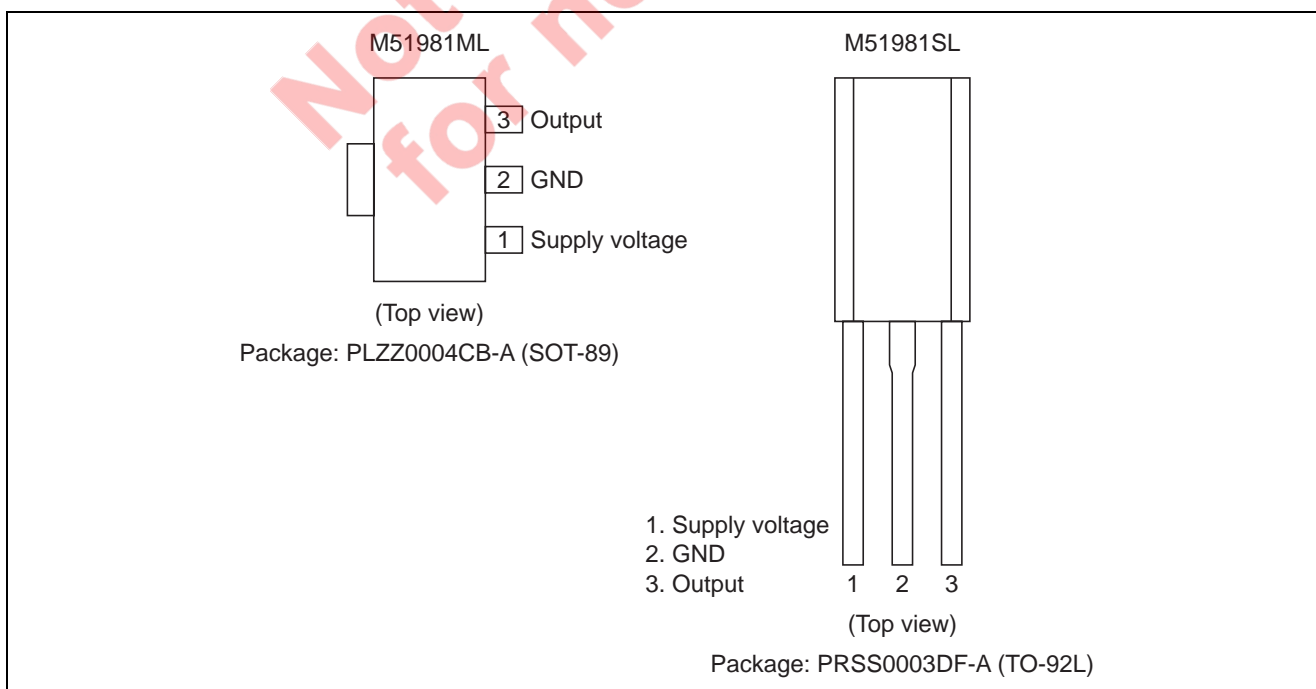
### Application

- Reset circuit of Pch, Nch, CMOS, microcomputer, CPU and MCU, Reset of logic circuit, Battery check circuit, switching circuit back-up voltage, level detecting circuit, waveform shaping circuit, delay waveform generating circuit, DC/DC converter, over voltage protection circuit

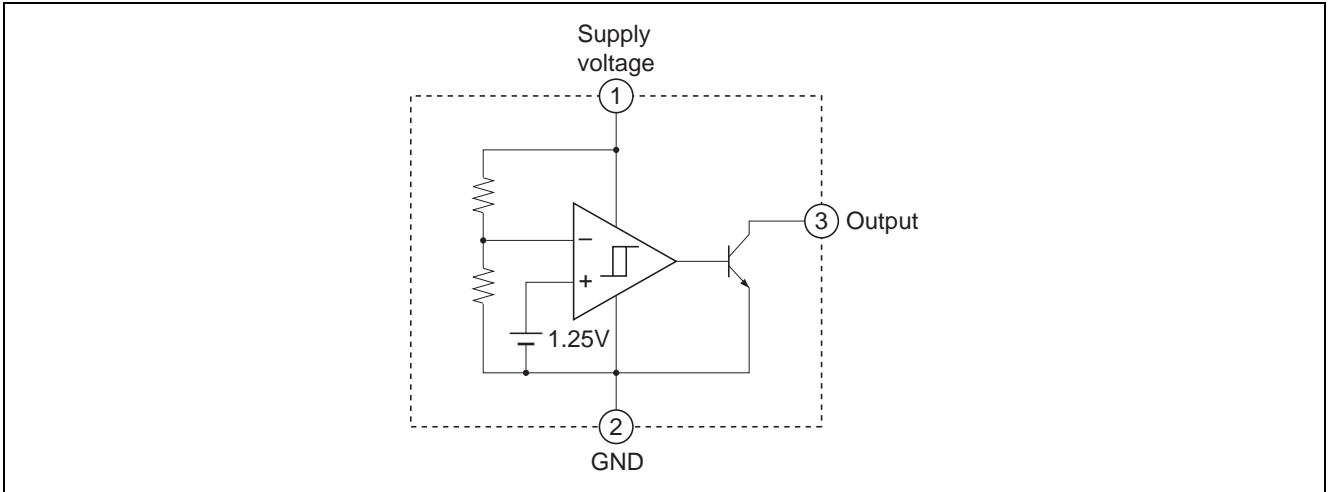
### Recommended Operating Condition

- Supply voltage range: 2 V to 17 V

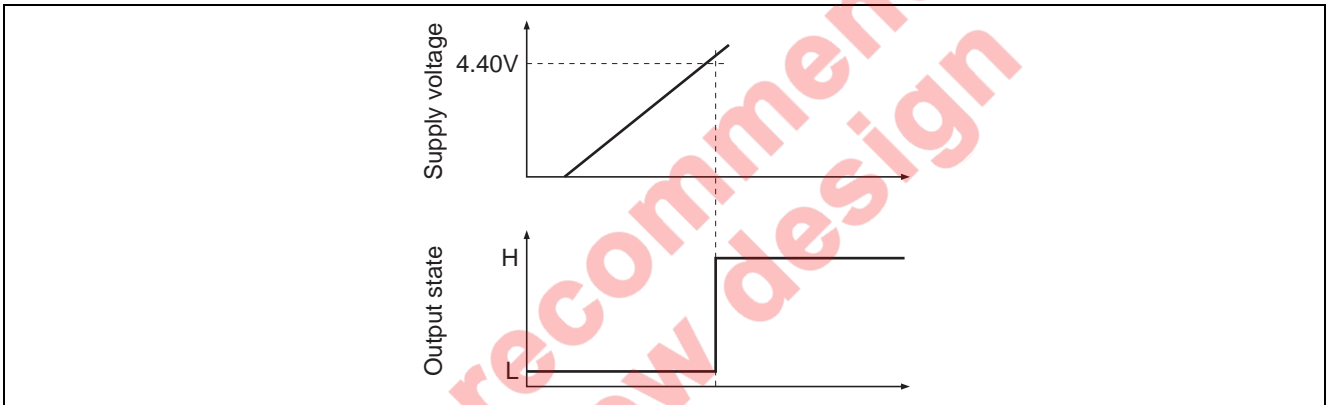
### Pin Arrangement



### Block Diagram



### Operating Waveform



Not recommend  
for new design

## Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V <sub>CC</sub>	18	V	
Output sink current	I <sub>sink</sub>	6	mA	
Output voltage	V <sub>O</sub>	18	V	Output with constant current load
Power dissipation	P <sub>d</sub>	700	mW	SL: TO-92L
		500		ML: SOT-89
Thermal derating	K <sub>θ</sub>	7	mW/°C	Ta ≥ 25°C
		5		
Operating temperature	T <sub>opr</sub>	-30 to +85	°C	
Storage temperature	T <sub>stg</sub>	-40 to +125	°C	

## Electrical Characteristics

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Detecting voltage	V <sub>s</sub>	4.20	4.40	4.60	V	
Hysteresis voltage	ΔV <sub>s</sub>	30	50	80	mV	
Detecting voltage temperature coefficient	V <sub>s</sub> /ΔT	—	0.01	—	%/°C	
Circuit current	I <sub>CC</sub>	—	340	510	μA	V <sub>CC</sub> = 5V
Output saturation voltage	V <sub>sat</sub>	—	0.2	0.4	V	V <sub>CC</sub> = 4V, I <sub>sink</sub> = 4mA
Threshold operating voltage	V <sub>OPL</sub>	—	0.67	0.8	V	L reset type minimum supply voltage for IC operation
		—	0.55	0.7		
Output leakage current	I <sub>OH</sub>	—	—	30	nA	
Propagation delay time	t <sub>PHL</sub>	—	6	—	μs	Response time when V <sub>CC</sub> changes H → L
	t <sub>PLH</sub>	—	3	—		Response time when V <sub>CC</sub> changes L → H

## Example of Application Circuit

### Reset Circuit of M51981

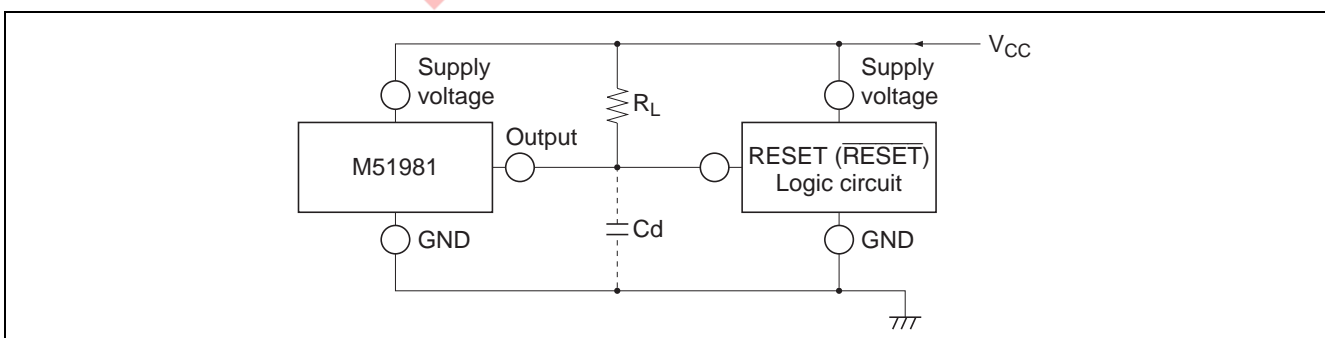
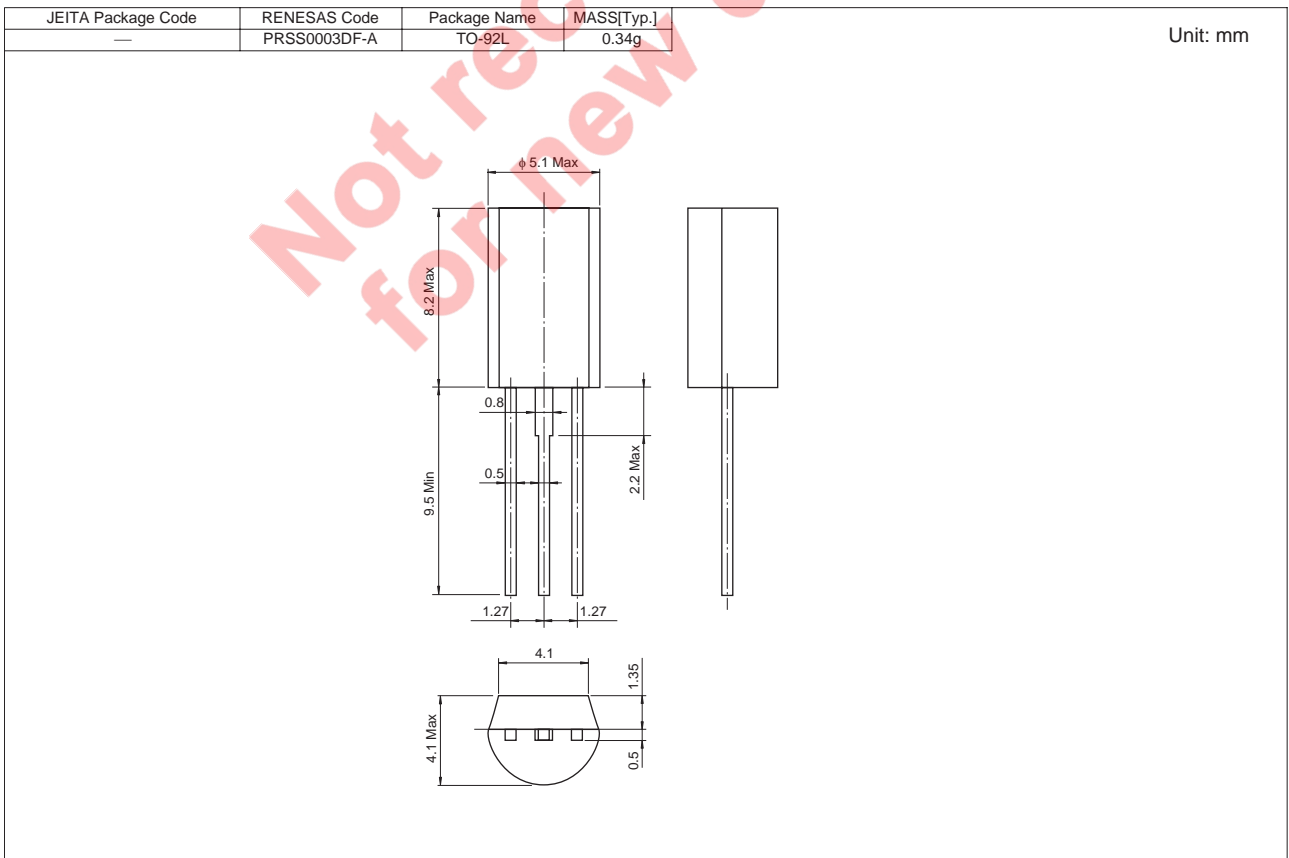
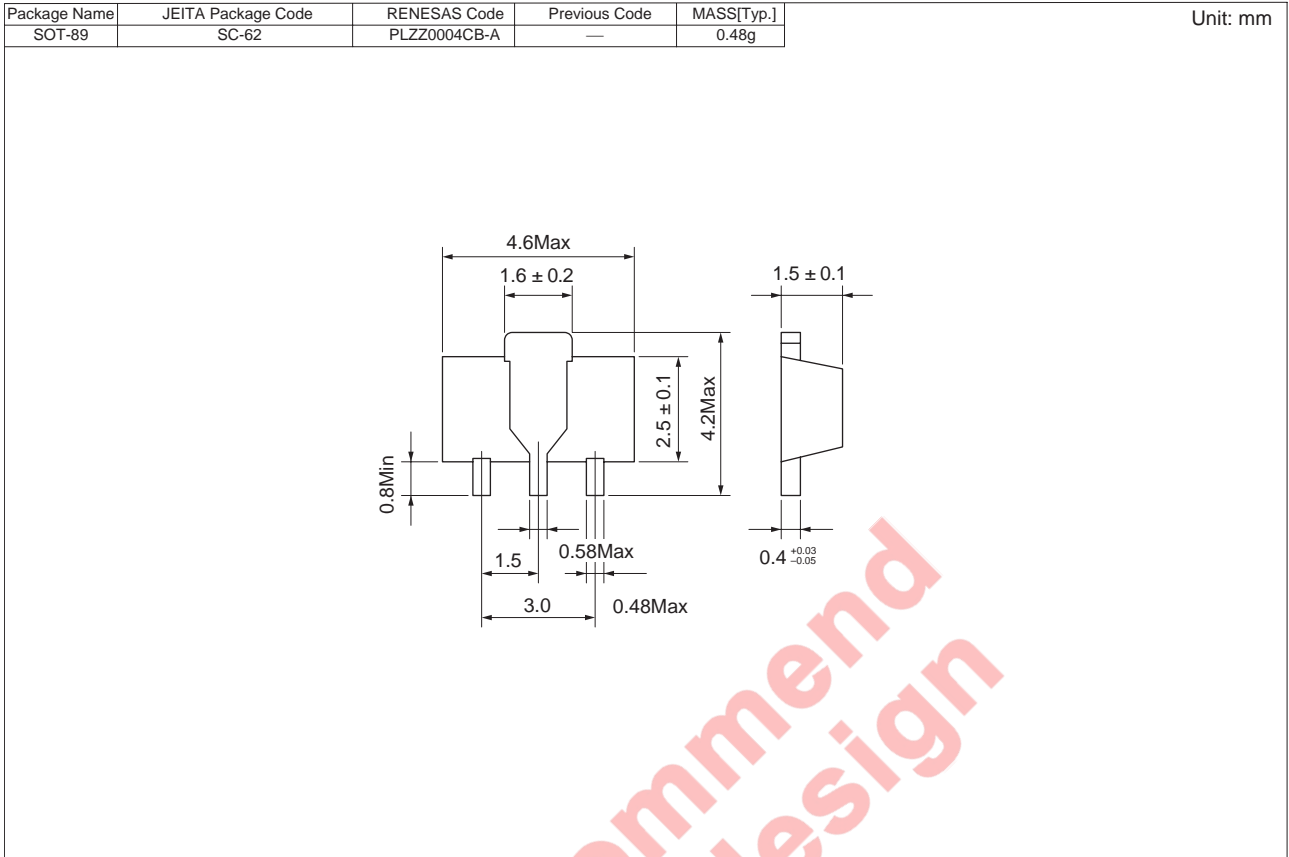


Figure 1 Reset Circuit of M51981

Note: 1. The logic circuit preferably should not have a pull-down resistor, but if one is present, add load resistor R<sub>L</sub> to overcome the pull-down resistor.

### Package Dimensions



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