

To all our customers

---

## **Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.**

---

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

# M51981ML / SL

## VOLTAGE DETECTING, SYSTEM RESETTING IC SERIES

### DESCRIPTION

M51981 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 circuits, 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) ..... 0.6V(TYP.) at  $R_L=22k\Omega$
- Wide supply voltage range ..... 2 to 17V
- Sudden change in power supply has minimal effect on the ICs
- Wide application range

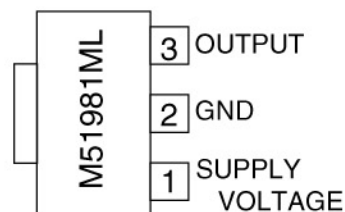
### APPLICATION

- Reset pulse generation for almost all logic circuits
- Battery checking, level detecting, waveform shaping circuits
- Delayed waveform generator
- Switching circuit to a back-up power supply
- DC/DC converter
- Over voltage protection circuit

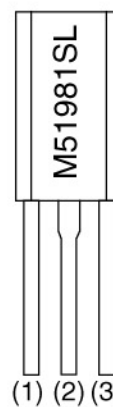
### RECOMMENDED OPERATING CONDITION

- Supply voltage range ..... 2 to 17V

### PIN CONFIGURATION (TOP VIEW)

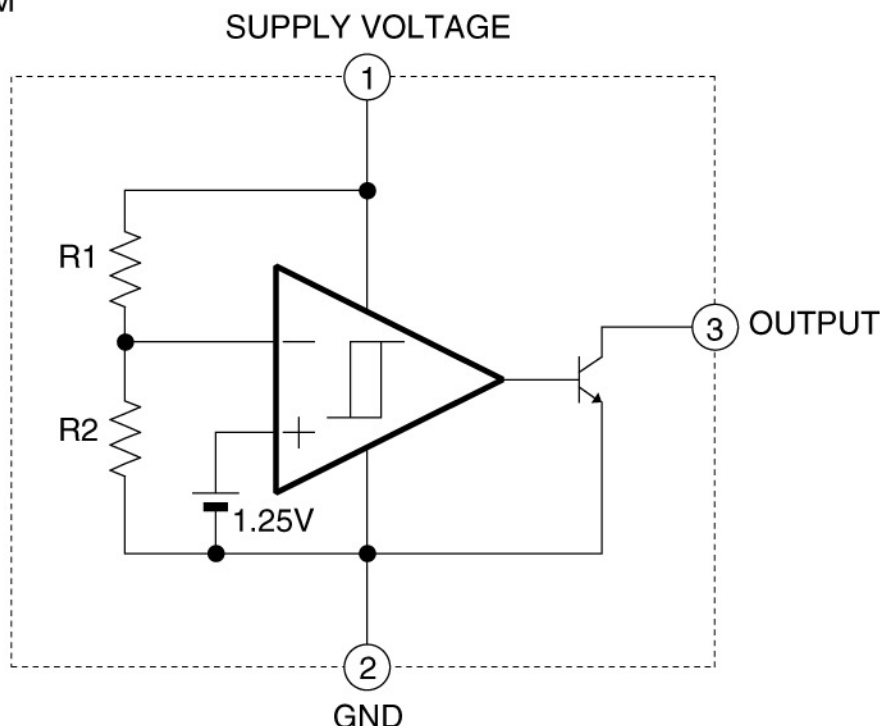


Outline SOT-89



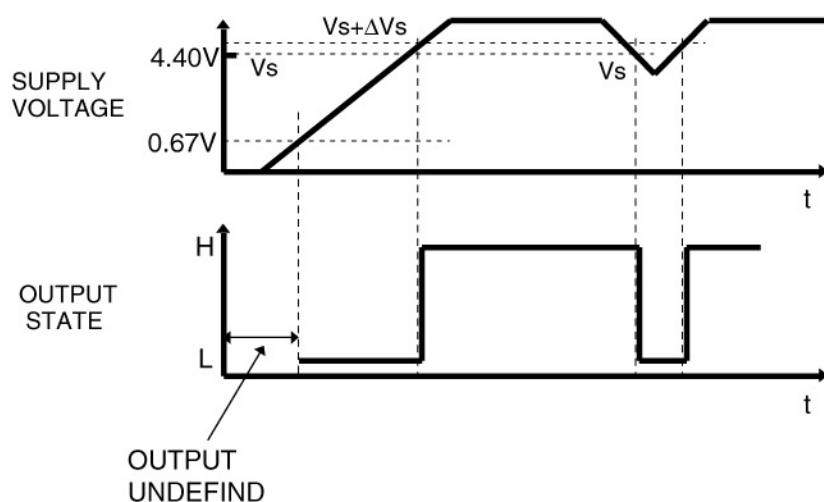
Outline TO-92L

### BLOCK DIAGRAM



**M51981ML / SL**

VOLTAGE DETECTING, SYSTEM RESETTING IC SERIES

**FUNCTION DIAGRAM****ABSOLUTE MAXIMUM RATINGS (Ta=25°C Unless otherwise noted)**

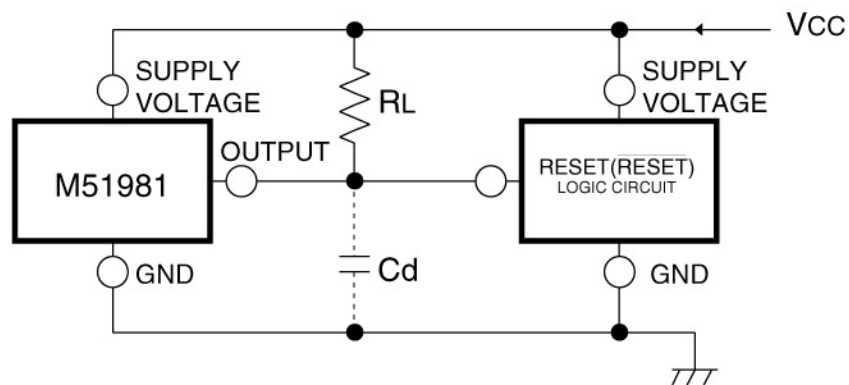
Symbol	Parameter	Test condition	Ratings	Unit	
V <sub>CC</sub>	Supply Voltage		18	V	
I <sub>sink</sub>	Output Sink Current		6	mA	
V <sub>O</sub>	Output Voltage	Output with constant current load	18	V	
P <sub>d</sub>	Power Dissipation	SL:TO-92L	700	mW	
		ML:SOT-89	500		
K <sub>θ</sub>	Thermal Derating	Ta≥25°C	SL:TO-92L ML:SOT-89	7 5	mW/°C
T <sub>opr</sub>	Operating Temperature			-30 to +85	
T <sub>stg</sub>	Storage Temperature			-40 to +125	°C

**ELECTRICAL CHARACTERISTICS (Ta=25°C, Unless otherwise noted)**

Symbol	Parameter	Test condition	Limits			Unit
			MIN	TYP	MAX	
V <sub>S</sub>	Detecting Voltage		4.20	4.40	4.60	V
ΔV <sub>S</sub>	Hysteresis Voltage		30	50	80	mV
V <sub>S</sub> /ΔT	Detecting Voltage Temperature Coefficient		—	0.01	—	%/°C
I <sub>CC</sub>	Circuit Current	V <sub>CC</sub> =5V	—	340	510	μA
V <sub>sat</sub>	Output Saturation Voltage	V <sub>CC</sub> =4V, I <sub>sink</sub> =4mA	—	0.2	0.4	V
V <sub>OPL</sub>	Threshold Operating Voltage	Minimum supply voltage for IC operation	R <sub>L</sub> =2.2kΩ, V <sub>sat</sub> ≤0.4V	0.67	0.8	V
			R <sub>L</sub> =100kΩ, V <sub>sat</sub> ≤0.4V	0.55	0.7	
I <sub>OH</sub>	Output Leakage Current		—	—	30	nA
		Ta= -30 to +85°C	—	—	1	μA
t <sub>PHL</sub>	Propagation Delay Time	Response time when V <sub>CC</sub> changes H to L	—	6	—	μs
t <sub>PLH</sub>		Response time when V <sub>CC</sub> changes L to H	—	3	—	

**M51981ML / SL**

VOLTAGE DETECTING, SYSTEM RESETTING IC SERIES

**Example of application circuit**  
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  $R_L$  to overcome the pull-down resistor.