

To all our customers

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

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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

MITSUBISHI STANDARD LINEAR IC  
**M6270X, M6271X,  
M6272X, M6273X, M6274XML/SL**  
VOLTAGE DETECTING, SYSTEM RESETTNG IC SERIES

### GENERAL DESCRIPTION

The M627XXML/SL is a voltage threshold detector designed for detection of a supply voltage and generation of a system reset pulse for almost all logic circuits such as microprocessor.

It also has extensive applications including battery checking, level detecting and waveform shaping circuits.

This product is on during the development, and there is a case rescheduling it future technical standard.

### FEATURES

- Detecting Voltage M627X2, M627X3 ..... 2.87V  
M627X4, M627X5 ..... 2.58V  
M627X6, M627X7 ..... 2.39V  
M627X8, M627X9 ..... 1.72V
- Hysterisis Voltage ..... 80mV
- Delay Time M6270X ..... 0sec  
M6271X ..... 200  $\mu$ sec  
M6272X ..... 50msec  
M6273X ..... 100msec  
M6274X ..... 200msec
- Few external parts
- Low threshold operating voltage (Supply voltage to keep low-state at low supply voltage) ... 0.65V(TYP.) at  $R_L=22k\Omega$
- Wide supply voltage range ..... 1.5V to 7.0V
- Sudden change in power supply has minimal effect on the ICs
- Extra small 3-pin package (3-pin FLAT)
- Built-in long delay time

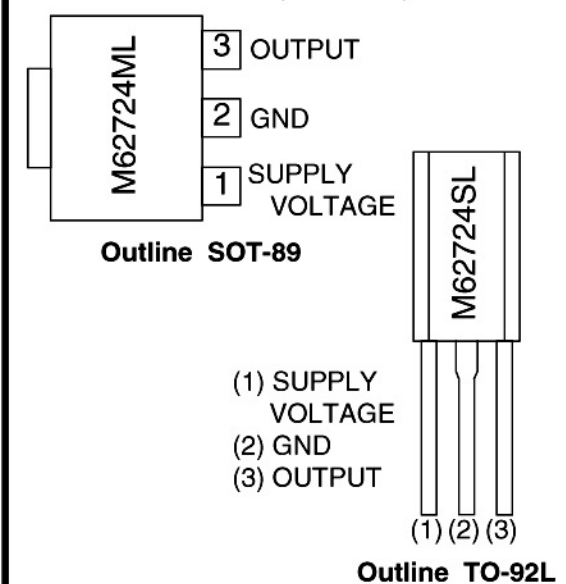
### APPLICATION

- 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

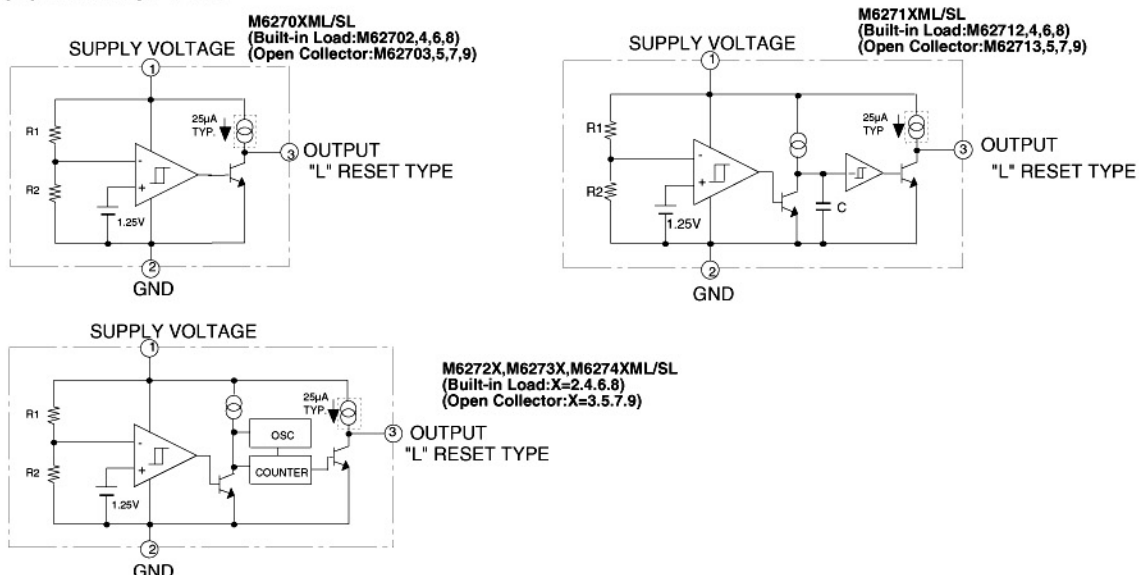
### RECOMMENDED OPERATING CONDITION

- Supply voltage range ..... 1.5V to 7.0V

### PIN CONFIGURATION (TOP VIEW) ex. M62724



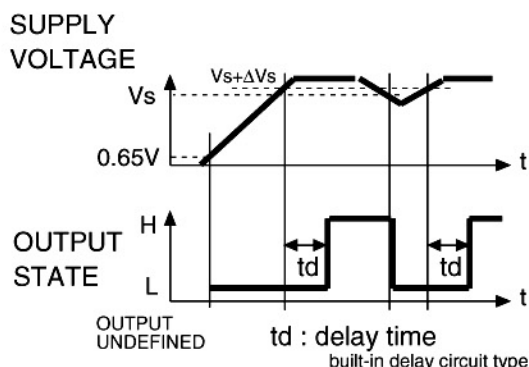
### BLOCK DIAGRAM



# M6270X, M6271X, M6272X, M6273X, M6274XML/SL

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## FUNCTION DIAGRAM



## OUTPUT FORM

| Built-in Load | Open Collector |
|---------------|----------------|
| M627X2        | M627X3         |
| M627X4        | M627X5         |
| M627X6        | M627X7         |
| M627X8        | M627X9         |

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C Unless otherwise noted)

| Symbol            | Parameter             | Test condition                    |           | Ratings         | Unit  |
|-------------------|-----------------------|-----------------------------------|-----------|-----------------|-------|
| I <sub>CC</sub>   | Supply Voltage        |                                   |           | 7               | V     |
| I <sub>sink</sub> | Output Sink Current   |                                   |           | 6               | mA    |
| V <sub>O</sub>    | Output Voltage        | Output with constant current load |           | V <sub>CC</sub> | V     |
| P <sub>d</sub>    | Power Dissipation     | 3pin SIP                          |           | 700             | mW    |
|                   |                       | 3pin FLAT                         |           | 500             |       |
| K <sub>θ</sub>    | Thermal Derating      | Ta≥25°C                           | 3PIN SIP  | 7               | mW/°C |
|                   |                       |                                   | 3PIN FLAT | 5               |       |
| T <sub>opr</sub>  | Operating Temperature |                                   |           | -30 to +85      | °C    |
| T <sub>stg</sub>  | Storage Temperature   |                                   |           | -40 to +125     | °C    |

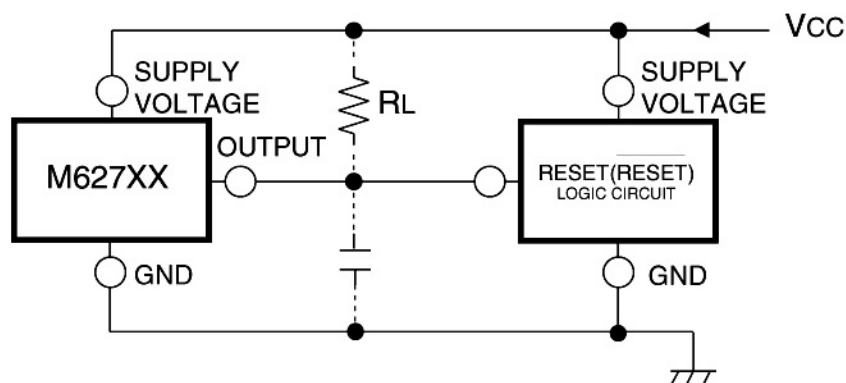
## ELECTRICAL CHARACTERISTICS (Ta=25°C, Unless otherwise noted)

| Symbol | Parameter                                 | Test condition                       |                           | Limits                                 |          |      | Unit |     |
|--------|-------------------------------------------|--------------------------------------|---------------------------|----------------------------------------|----------|------|------|-----|
|        |                                           |                                      |                           | MIN                                    | TYP      | MAX  |      |     |
| Vs     | Detecting Voltage                         |                                      | M627X2,3                  | 2.74                                   | 2.87     | 3.00 | V    |     |
|        |                                           |                                      | M627X4,5                  | 2.46                                   | 2.58     | 2.70 |      |     |
|        |                                           |                                      | M627X6,7                  | 2.28                                   | 2.39     | 2.50 |      |     |
|        |                                           |                                      | M627X8,9                  | 1.64                                   | 1.72     | 1.80 |      |     |
| ΔVs    | Hysteresis Voltage                        |                                      |                           | 50                                     | 80       | 110  | mV   |     |
| Vs/ΔT  | Detecting Voltage Temperature Coefficient |                                      |                           |                                        | 0.01     |      | %/°C |     |
| Icc    | Circuit Current                           | NO OSC & COUNTER                     | M6270X                    | 100                                    | 200      | 340  | μA   |     |
|        |                                           |                                      | M6271X                    | 120                                    | 220      | 400  |      |     |
|        |                                           | Built-in OSC & COUNTER<br>X=2,3,4    | Vcc=3.3V                  | M627X2                                 | 250      | 395  |      | 560 |
|        |                                           |                                      |                           | M627X3                                 | 225      | 370  |      | 535 |
|        |                                           |                                      | Vcc=3.0V                  | M627X4                                 | 230      | 375  |      | 540 |
|        |                                           |                                      |                           | M627X5                                 | 205      | 350  |      | 515 |
|        |                                           |                                      | Vcc=2.7V                  | M627X6                                 | 200      | 345  |      | 510 |
|        |                                           |                                      |                           | M627X7                                 | 175      | 320  |      | 485 |
|        | Vcc=2.0V                                  | M627X8                               | 130                       | 275                                    | 440      |      |      |     |
|        |                                           | M627X9                               | 105                       | 250                                    | 415      |      |      |     |
| tPd    | Delay Time                                | Response Time                        | M6270X                    |                                        | 3        |      | μs   |     |
|        |                                           | Ta=-30~+85°C                         | M6271X                    | 80                                     | 200      | 500  | ms   |     |
|        |                                           |                                      | M6272X                    | 30                                     | 50       | 70   |      |     |
|        |                                           |                                      | M6273X                    | 60                                     | 100      | 140  |      |     |
|        |                                           |                                      | M6274X                    | 120                                    | 200      | 280  |      |     |
|        |                                           | Vsat                                 | Output Saturation Voltage | Vcc=2V, Isink=4mA / M627X8,9: Vcc=1.6V |          |      | 0.2  | 0.4 |
| VOPL   | Threshold Operating Voltage               | Minimum supply voltage for operation | RL=2.2kΩ, Vsat≤0.4V       |                                        | 0.7      | 0.8  | V    |     |
|        |                                           |                                      | RL=100kΩ Vsat≤0.4V        |                                        | 0.6      | 0.7  |      |     |
| Ioc    | Output Load Current                       | Built-in Load type                   | Vo=1/2*Vcc                | -40                                    | -25      | -17  | μA   |     |
| VOH    | Output HIGH Voltage                       | Built-in Load type                   |                           | Vcc-0.2                                | Vcc-0.06 |      | V    |     |
| IOH    | Output Leak Current                       | Open Collector type                  |                           |                                        |          | 30   | nA   |     |
|        |                                           |                                      | Ta=-30~+85°C              |                                        |          | 1    | μA   |     |

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**Example of application circuit**  
**Reset Circuit of M627XX Series**



**Note 1.**

The logic circuit preferably should not have a pull-down resistor, but if one is present, add load resistor RL to overcome the pull-down resistor.

⚠ Mitsubishi Electric Corporation 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 design, in order to prevent fires from spreading, redundancy, malfunction or other mishap.