# RICOH RP23C4000

## CMOS 4M bit MASK ROM
(524,288 word × 8 bit / 262,144 word × 16 bit)

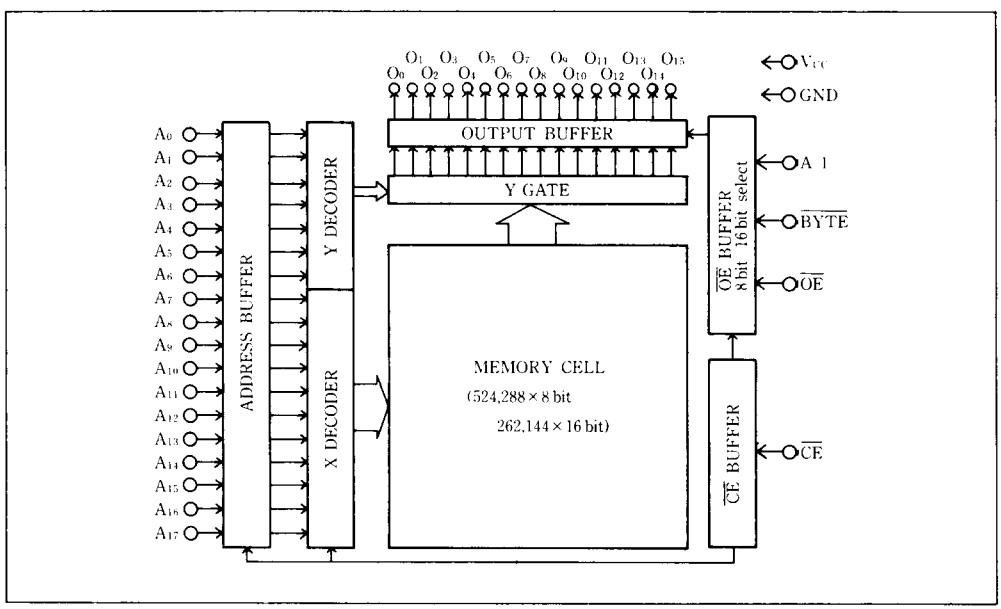
## ■ OUTLINE

The RP23C4000 is a static CMOS read only Memory organized as 524,288 words by 8 bits or 262,144 words by 16 bits and operates from a single +5V supply. The bit organization can be selected electrically. The RP23C4000 has 3-state output and TTL compatible Output/Input, and can be connected to CPU busline directly.

## ■ FEATURES

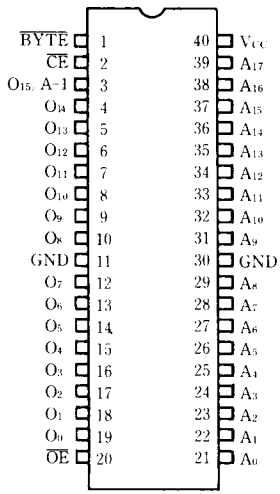
- 524,288 words × 8 bits (8 bit mode)/262,144 words × 16 bits (16 bit mode) organization (electrically selected)
- Low power dissipation — Active 220 mW max. / Standby 550 μW max.
- Fast access time 200 ns max.
- Single +5V (±10%) power supply
- Completely TTL compatible : All outputs and inputs
- 3-state outputs
- Package : 40 pin DIP

## ■ BLOCK DIAGRAM



## ■ PIN CONFIGURATION

( TOP View )




## ■ PIN DESCRIPTION

| PIN NAME | FUNCTION |
|---|---|
| $\overline{BYTE}$ | 8 bit/16 bit mode select input |
| $\overline{CE}$ | Chip enable input |
| $O_{15}$ /A−1 | (16 bit mode ) data output/<br>( 8 bit mode) LSB address |
| $O_0 \sim O_{14}$ | Data output |
| $A_0 \sim A_{17}$ | Address input |
| $\overline{OE}$ | Output enable input |
| Vcc | +5V power supply |
| GND | GND |

## ■ TRUTH TABLE

| $\overline{CE}$ | $\overline{OE}$ | $\overline{BYTE}$ | A − 1 ($O_{15}$) | Standby/ Active | $O_0 \sim O_7$ | $O_8 \sim O_{15}$ | mode | LSB | MSB |
|---|---|---|---|---|---|---|---|---|---|
| H | X | X | X | Standby | Hi−Z | Hi−Z | output | – | – |
| L | H | X | X | Active | Hi−Z | Hi−Z | Hi−Z | | |
| L | L | H | input inhibition | | $O_0 \sim O_7$ | $O_8 \sim O_{15}$ | 16 bit | $A_0$ | $A_{17}$ |
| L | L | L | L | | $O_0 \sim O_7$ | Hi−Z | 8 bit | A−1 | $A_{17}$ |
| L | L | L | H | | $O_8 \sim O_{15}$ | Hi−Z | | | |

L : Low level
H : High level
X : No effect
Hi−Z : High impedance output

## ■ ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Condition | Limit | Unit |
|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | With respect to GND | −0.3~7 | V |
| $V_I$ | Input Voltage | | −0.3~Vcc+0.3 | V |
| $V_O$ | Output Voltage | | −0.3~Vcc+0.3 | V |
| Topr | Operating Ambient Temperature | | 0~70 | ℃ |
| Tstg | Storage Temperature | | −40~125 | ℃ |

## ■ RECOMMENDED OPERATING CONDITIONS (Ta=0~70℃)

| Symbol | Parameter | Specified Value | | | Unit |
|---|---|---|---|---|---|
| | | Min | Typ | Max | |
| $V_{CC}$ | Supply Voltage | 4.5 | 5.0 | 5.5 | V |
| $V_{IH}$ | Input High Voltage | 2.0 | | $V_{CC}$ | V |
| $V_{IL}$ | Input Low Voltage | −0.3 | | 0.8 | V |

## ■ ELECTRICAL CHARACTERISTICS

### ● DC ELECTRICAL CHARACTERISTICS (Ta=0~70℃, $V_{CC}$=5V±10%)

| Symbol | Parameter | Test Condition | Specified Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $I_{CC1}$ | Supply Current (Standby) | $\overline{CE}=V_{CC}$ | | | 100 | μA |
| $I_{CC2}$ | Supply Current (Active) | $I_O$=0mA | | | 40 | mA |
| $V_{OH}$ | Output High Voltage | $I_{OH}=-400\mu A$ | 2.4 | | | V |
| $V_{OL}$ | Output Low Voltage | $I_{OL}$=2.0mA | | | 0.4 | V |
| $V_{IH}$ | Input High Voltage | | 2.0 | | $V_{CC}$ | V |
| $V_{IL}$ | Input Low Voltage | | −0.3 | | 0.8 | V |
| $I_{LI}$ | Input Leakage Current | $V_I$=0V~$V_{CC}$ | −10 | | 10 | μA |
| $I_{LO}$ | Output Leakage Current | $V_O$=0V~$V_{CC}$ Chip Deselected | −10 | | 10 | μA |

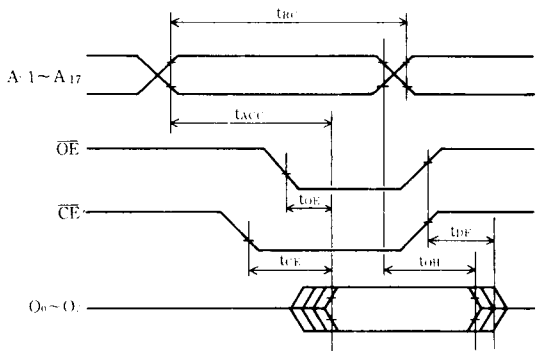
### ● AC ELECTRICAL CHARACTERISTICS (Ta=0~70℃, $V_{CC}$=5V±10%)

| Symbol | Parameter | Specified Valve | | | Unit |
|---|---|---|---|---|---|
| | | Min | Typ | Max | |
| $t_{RC}$ | Read Cycle Time | 200 | | | ns |
| $t_{ACC}$ | Address Access Time | | | 200 | ns |
| $t_{CE}$ | Chip Enable Access Time | | | 200 | ns |
| $t_{OE}$ | Output Enable Access Time | | | 80 | ns |
| $t_{DF}$ | Output Floating Delay Time | 0 | | 80 | ns |
| $t_{OH}$ | Output Hold Time | 0 | | | ns |
| $t_{BYT}$ | Byte Access Time | | | 200 | ns |

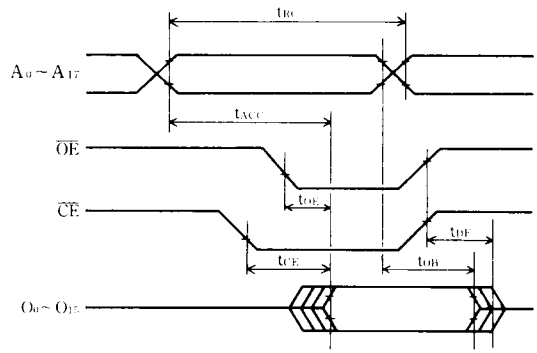
Note) Test Condition
Input Pulse Voltage: $V_{IL}$=0.6V, $V_{IH}$=2.4V
Input Pulse Rise/Fall Time: 10ns
Timing Measuring Voltage:
Input $V_{IL}$=0.8V, $V_{IH}$=2.2V
Output $V_{OL}$=0.8V, $V_{OH}$=2.0V
Output Load: 1TTL + 100pF
(including jig capacitance)

## ■ TIMING CHART

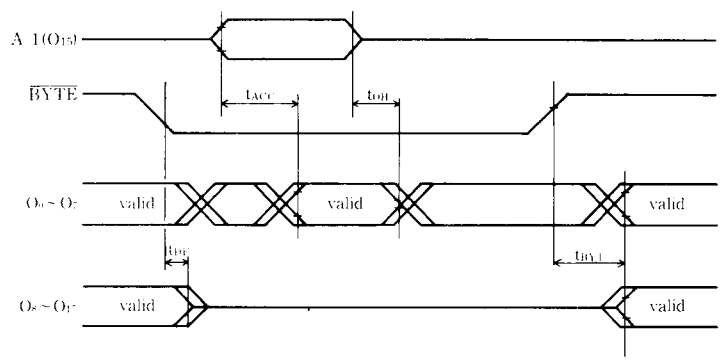
- **8 bit mode** ($\overline{BYTE} = V_{IH}$)




- **16 bit mode** ($\overline{BYTE} = V_{IL}$)




- **8 bit mode/16 bit mode Select** (for $A_0 \sim A_{17}$, $\overline{CE}$ = "L", $\overline{OE}$ = "L")



## ■ PACKAGE DIMENSION (mm/inch)