SHARP

2/19

| SPEC No. | MR96307 |
|---|---|
| ISSUE: | Mar.29 1996 |

To: _____

PRELIMINARY

# SPECIFICATIONS

Product Type 8M bit MASK ROM

## LH5G8P××

(LH58FV8P00T-X)

※This specifications contains 9 pages including the cover.
If you have any objections, please contact us before issuing purchasing order.

PRESENTED

BY: M. Okada

M. OKADA
Dept. General Manager

REVIEWED BY: Y. Hotta

PREPARED BY: M. Hayaseki

Engineering Dept. 1
Memory Engineering Center
Tenri Integrated Circuits Group
SHARP CORPORATION

SHARP

3/19

LH53FV8P00T-X

●Handle this document carefully for it contains material protected by international copyright law. Any reproduction, full or in part, of this material is prohibited without the express written permission of the company.

●When using the products covered herein, please observe the conditions written herein and the precautions outlined in the following paragraphs. In no event shall the company be liable for any damages resulting from failure to strictly adhere to these conditions and precautions.

(1) The products covered herein are designed and manufactured for the following application areas. When using the products covered herein for the equipment listed in Paragraph (2), even for the following application areas, be sure to observe the precautions given in Paragraph (2). Never use the products for the equipment listed in Paragraph (3).

- ·Office electronics
- ·Instrumentation and measuring equipment
- ·Machine tools
- ·Audiovisual equipment
- ·Home appliances
- ·Communication equipment other than for trunk lines

(2) Those contemplating using the products covered herein for the following equipment which demands high reliability, should first contact a sales representative of the company and then accept responsibility for incorporating into the design fail-safe operation, redundancy, and other appropriate measures for ensuring reliability and safety of the equipment and the overall system.

- ·Control and safety devices for airplanes, trains, automobiles, and other transportation equipment
- ·Mainframe computers
- ·Traffic control systems
- ·Gas leak detectors and automatic cutoff devices
- ·Rescue and security equipment
- ·Other safety devices and safety equipment, etc.

(3) Do not use the products covered herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.

- ·Aerospace equipment
- ·Communications equipment for trunk lines
- ·Control equipment for the nuclear power industry
- ·Medical equipment related to life support, etc.

(4) Please direct all queries and comments regarding the interpretation of the above three Paragraphs to a sales representative of the company.

●Please direct all queries regarding the products covered herein to a sales representative of the company.

# CONTENTS

## 1. General Description

The Sharp LH5G8Pxx(LH53FV8P00T) is an 8Mbit CMOS mask ROM (mask-programmable read-only memory), produced by the silicon gate CMOS process.

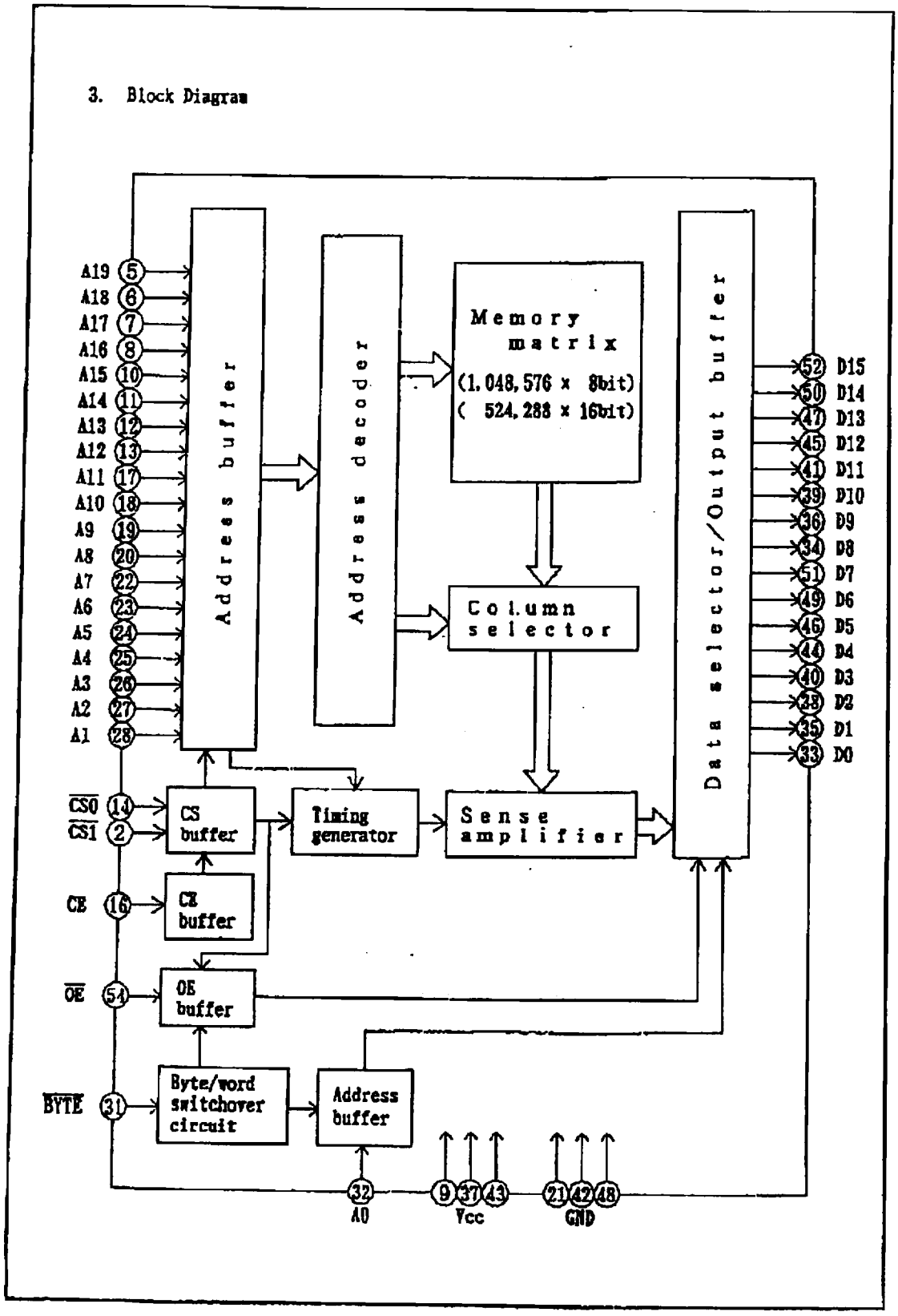
## 2. Features

- Memory organization selection
  1,048,576 x 8-bit (Byte mode : $\overline{BYTE}=V_{IL}$)
  524,288 x 16-bit (Word mode : $\overline{BYTE}=V_{IH}$)
- Supply voltage:
  3.3V ± 0.3V
- Static operation
- 3-state output
- Access time:
  120ns (Max.)
- 56Pin-TSOP(TYPE-I)
- Supply current
  Operating: 35mA (Max.)
  Standby : 30μA (Max.)
- Others
  Non programmable
  Not designed or rated as radiation hardened
  CMOS process(P type silicon substrate)

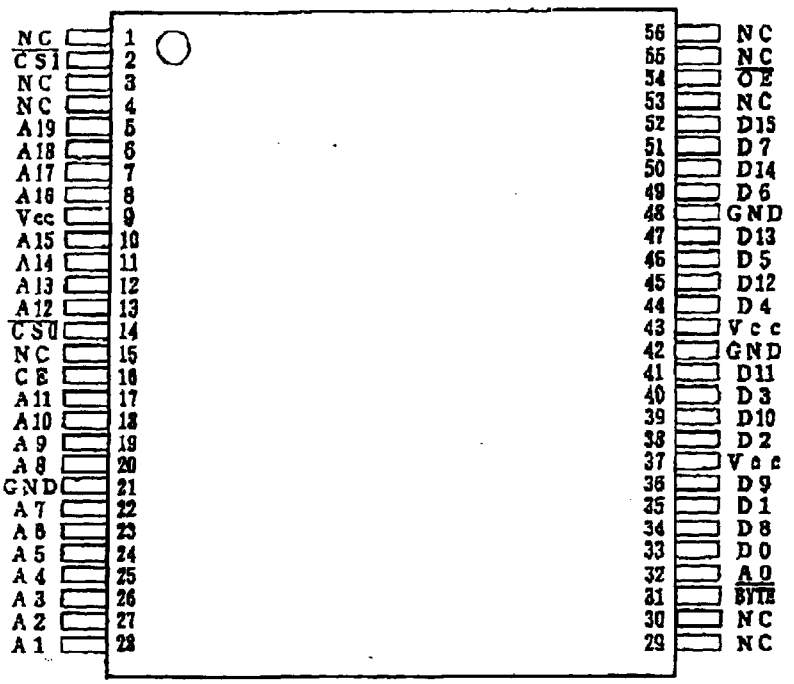
SHARP



3. Block Diagram



4. Pin Connections




(56Pin-TSOP TYPE-I)

5. Pin Description

| | |
|---|---|
| A0 ~ A19 | Address input |
| D0 ~ D15 | Data output |
| BYTE | x8bit/x16bit(byte/word) mode select input (Note) |
| CE | Chip enable input (Note) |
| CS0, CS1 | Chip select input (Note) |
| OE | Output enable input (Note) |
| Vcc | Power pin |
| GND | Ground |
| NC | Non connection (Non wire bonding) |

(Note)

| CE | CS0 | CS1 | OE | BYTE | A0 | Data output | | Address input | | Supply current |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | D0~D7-Pin | D8~D15-Pin | LSB | MSB | |
| L | X | X | X | X | X | High impedance | High impedance | – | – | Standby |
| H | H | H | X | X | X | High impedance | High impedance | – | – | Power down |
| H | H | L | X | X | X | High impedance | High impedance | – | – | Power down |
| H | L | H | X | X | X | High impedance | High impedance | – | – | Power down |
| H | L | L | H | X | X | High impedance | High impedance | – | – | Operating |
| H | L | L | L | H | – | D0~D7 | D8~D15 | A1 | A19 | Operating |
| H | L | L | L | L | L | D0~D7 | High impedance | A0 | A19 | Operating |
| H | L | L | L | L | H | D8~D15 | High impedance | A0 | A19 | Operating |

X : Don't Care

6. Absolute Maximum Ratings

| Item | Symbol | Rating | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | −0.3 ~ +4.6 | V |
| Input Voltage | $V_{IN}$ | −0.3 ~ Vcc+0.3 | V |
| Output Voltage | $V_{OUT}$ | −0.3 ~ Vcc+0.3 | V |
| Operating Temperature | $T_{OPR}$ | 0 ~ +70 | ℃ |
| Storage Temperature | $T_{STG}$ | −65 ~ +150 | ℃ |

7. Operating Ranges

Ta=0~70℃

| Item | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Supply Voltage | Vcc | 3.0 | 3.3 | 3.6 | V |

8. D.C. Electrical Characteristics

Vcc=3.3V±0.3V , Ta=0~70℃

| Item | Symbol | Test conditions | Min. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Input high voltage | $V_{IH}$ | | 2.0 | Vcc+0.3 | V | |
| Input low voltage | $V_{IL}$ | | -0.3 | 0.8 | V | |
| Output high voltage | $V_{OH}$ | $I_{OH}$=−400μA | 2.4 | | V | |
| Output low voltage | $V_{OL}$ | $I_{OL}$=2.0mA | | 0.4 | V | |
| Input leakage current | $\lvert I_{LI} \rvert$ | $V_{IN}$=0V~Vcc | | 5 | μA | |
| Output leakage current | $\lvert I_{LO} \rvert$ | $V_{OUT}$=0V~Vcc | | 5 | μA | 1 |
| Supply current(Operating) | $I_{CC1}$ | $t_{RC}$=120ns | | 35 | mA | 2 |
| Supply current (Power down) | $I_{PD1}$ | $\overline{CS0}$, $\overline{CS1}$, $\overline{CE}$=$V_{IH}$ | | 1 | mA | |
| | $I_{PD2}$ | $\overline{CS0}$, $\overline{CS1}$, $\overline{CE}$=Vcc−0.2V | | 50 | μA | |
| Supply current (standby) | $I_{SB1}$ | $\overline{CE}$=$V_{IL}$ | | 1 | mA | |
| | $I_{SB2}$ | $\overline{CE}$=0.2V | | 30 | μA | |
| Input capacitance | $C_{IN}$ | f=1MHz | | 10 | pF | |
| Output capacitance | $C_{OUT}$ | Ta=25℃ | | 10 | pF | |

Note 1: $\overline{CE}$ = $V_{IL}$
$\overline{OE}$ = $V_{IH}$

Note 2: $V_{IN}$ = $V_{IH}$ , $V_{IL}$
$\overline{CE}$ = $V_{IL}$ (Output is open)
$\overline{CS0}$, $\overline{CS1}$ = $V_{IL}$

9. A.C. Electrical Characteristics

$V_{CC}$=3.3V±0.3V , Ta=0~70℃

| Item | symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Read cycle time | $t_{RC}$ | 120 | | ns |
| Address access time | $t_{AA}$ | | 120 | |
| Chip enable access time | $t_{ACE}$ | | 130 | |
| Chip select access time | $t_{ACS}$ | | 120 | |
| Output enable delay time | $t_{OE}$ | | 50 | |
| Output hold time | $t_{OH}$ | 5 | | |
| Output floating time | $t_{CEHZ}$ | | 50 (Note) | |
| | $t_{CSHZ}$ | | | |
| | $t_{OHZ}$ | | | |

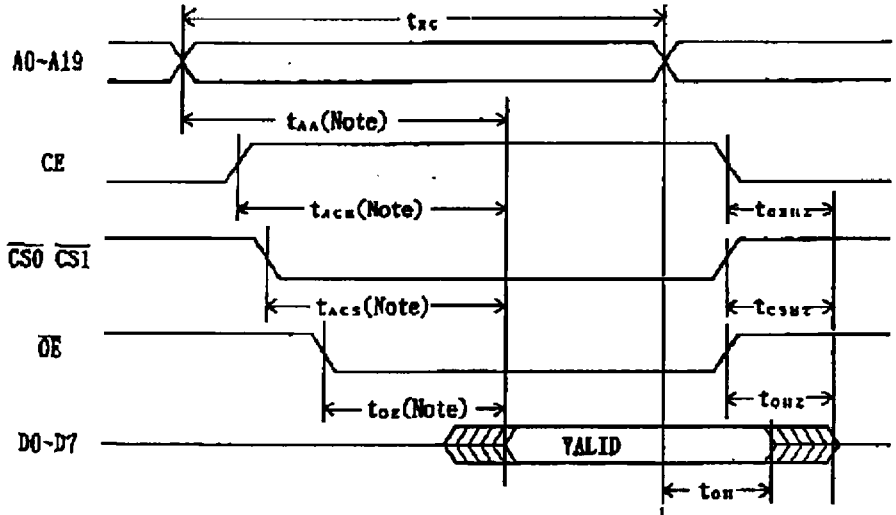
Test Condition

| | |
|---|---|
| Input voltage amplitude | : 0.6V ~ 2.2V |
| Input signal rise time | : 10ns |
| Input signal fall time | : 10ns |
| Input reference level | : 1.4V |
| Output reference level | : 1.4V |
| Output load condition | : 1TTL + 100pF |

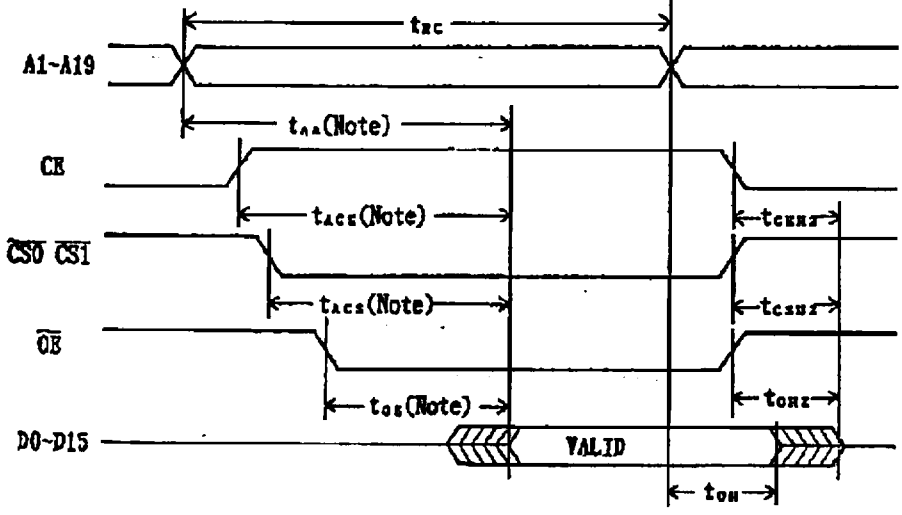
(Note) Determined by the time for the output to be opened.
( irrespective of output voltage )

10. Timing Chart

i) Byte mode ($\overline{BYTE}$=$V_{IL}$)




ii) Word mode ($\overline{BYTE}$=$V_{IH}$)




Note : The output data becomes valid when the last interval, $t_{AA}$ , $t_{ACE}$ , $t_{ACS}$ or $t_{OE}$ have concluded.

11. Note

It is recommended that a decoupling capacitor be connected between Vcc and Gnd-Pin.