

## 4M (512K x 8-bit) Mask ROM

### ■ DESCRIPTION

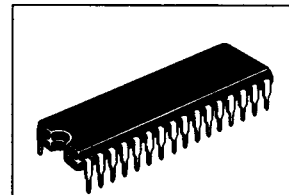
The Hitachi HN62315B Series is a 4-Megabit CMOS Mask Programmable Read Only Memory organized as 524,288 x 8-bits.

The low power consumption of this device makes it ideal for battery powered, portable systems. In addition, the high density and high speed provide enough capacity and high performance to be used as a character generator in laser printers.

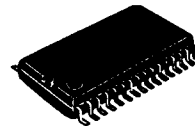
Hitachi's HN62315B Series is offered with JEDEC-Standard Byte-Wide EPROM pinouts in 32-pin Plastic DIP, 32-lead Plastic SOP and 32-lead Plastic TSOP packages. This allows socket replacement with EPROMs and Flash Memory.

### ■ FEATURES

- Single Power Supply:  
 $V_{CC} = 5V \pm 10\%$
- Fast Access Times:  
 150 ns/200 ns (max)
- Low Power Consumption:  
 Active Current: 100 mW (typ)  
 Standby Current: 5  $\mu$ W (typ)
- Byte-Wide Data Organization
- TTL-Compatible Inputs and Outputs
- Three-State Data Outputs
- Pin Arrangement:  
 JEDEC Standard Byte-Wide EPROM  
 EPROM and Flash Memory Compatible
- Packages:  
 32-pin Plastic DIP  
 32-lead Plastic SOP  
 32-lead Plastic TSOP (Type-II)



(DP-32)



(FP-32D)

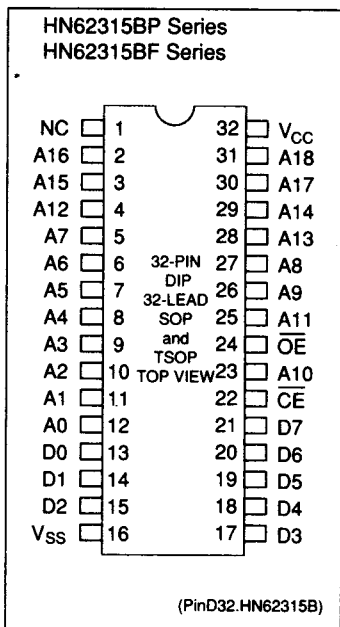


(TTP-32D)

### ■ ORDERING INFORMATION

| Type No.      | Access Time | Package              |
|---------------|-------------|----------------------|
| HN62315BP-15  | 150 ns      | 32-pin Plastic DIP   |
| HN62315BP-20  | 200 ns      | (DP-32)              |
| HN62315BF-15  | 150 ns      | 32-lead Plastic SOP  |
| HN62315BF-20  | 200 ns      | (FP-32D)             |
| HN62315BTT-15 | 150 ns      | 32-lead Plastic TSOP |
| HN62315BTT-20 | 200 ns      | (TTP-32D)            |

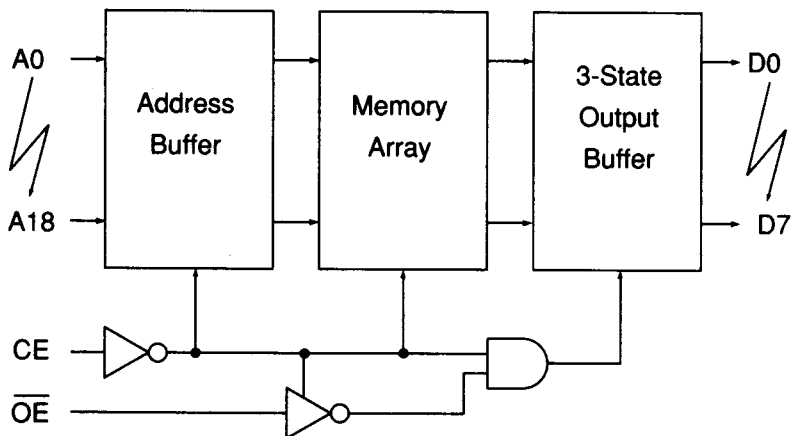
■ PIN ARRANGEMENT



■ PIN DESCRIPTION

| Pin Name                         | Function      |
|----------------------------------|---------------|
| A <sub>0</sub> - A <sub>18</sub> | Address       |
| D <sub>0</sub> - D <sub>7</sub>  | Output        |
| $\overline{CE}$                  | Chip Enable   |
| $\overline{OE}$                  | Output Enable |
| V <sub>CC</sub>                  | Power Supply  |
| V <sub>SS</sub>                  | Ground        |
| NC                               | No Connection |

■ BLOCK DIAGRAM



(BD.HN62315B)

**■ ABSOLUTE MAXIMUM RATINGS**

| Item                          | Symbol     | Value                  | Unit |
|-------------------------------|------------|------------------------|------|
| Supply Voltage <sup>1</sup>   | $V_{CC}$   | -0.3 to +7.0           | V    |
| Terminal Voltage <sup>1</sup> | $V_T$      | -0.3 to $V_{CC} + 0.3$ | V    |
| Operating Temperature Range   | $T_{OPR}$  | 0 to +70               | °C   |
| Storage Temperature Range     | $T_{STG}$  | -55 to +125            | °C   |
| Temperature Under Bias        | $T_{BIAS}$ | -20 to +85             | °C   |

Notes: 1. With respect to  $V_{SS}$ .

**■ CAPACITANCE**

( $V_{CC} = 5V \pm 10\%$ ,  $V_{SS} = 0V$ ,  $T_a = 25^\circ C$ ,  $V_{IN} = 0V$ ,  $f = 1MHz$ )

| Item                            | Symbol    | Min. | Max. | Unit |
|---------------------------------|-----------|------|------|------|
| Input Capacitance <sup>1</sup>  | $C_{IN}$  | -    | 15   | pF   |
| Output Capacitance <sup>1</sup> | $C_{OUT}$ | -    | 15   | pF   |

Notes: 1. This parameter is sampled and not 100% tested.

**■ DC ELECTRICAL CHARACTERISTICS FOR READ OPERATION**

( $V_{CC} = 5V \pm 10\%$ ,  $V_{SS} = 0V$ ,  $T_a = 0$  to  $70^\circ C$ )

| Item                       | Symbol   | Min. | Max.           | Unit    | Test Condition  |
|----------------------------|----------|------|----------------|---------|---|
| Input Leakage Current      | $I_{LI}$ | -    | 10             | $\mu A$ | $V_{IN} = 0$ to $V_{CC}$                                    |
| Output Leakage Current     | $I_{LO}$ | -    | 10             | $\mu A$ | $\overline{CE} = 2.2V$ , $V_{OUT} = 0$ to $V_{CC}$          |
| Operating $V_{CC}$ Current | $I_{CC}$ | -    | 50             | mA      | $V_{CC} = 5.5V$ , $I_{DOUT} = 0$ mA, $t_{RC} = \text{min.}$ |
| Standby $V_{CC}$ Current   | $I_{SB}$ | -    | 30             | $\mu A$ | $V_{CC} = 5.5V$ , $\overline{CE} \geq V_{CC} - 0.2V$        |
| Input Voltage              | $V_{IH}$ | 2.2  | $V_{CC} + 0.3$ | V       |   |
|                            | $V_{IL}$ | -0.3 | 0.8            | V       |   |
| Output Voltage             | $V_{OH}$ | 2.4  | -              | V       | $I_{OH} = -205 \mu A$                                       |
|                            | $V_{OL}$ | -    | 0.4            | V       | $I_{OL} = 1.6$ mA   |

■ AC ELECTRICAL CHARACTERISTICS FOR READ OPERATION

( $V_{CC} = 5V \pm 10\%$ ,  $V_{SS} = 0V$ ,  $T_a = 0$  to  $70^\circ C$ )

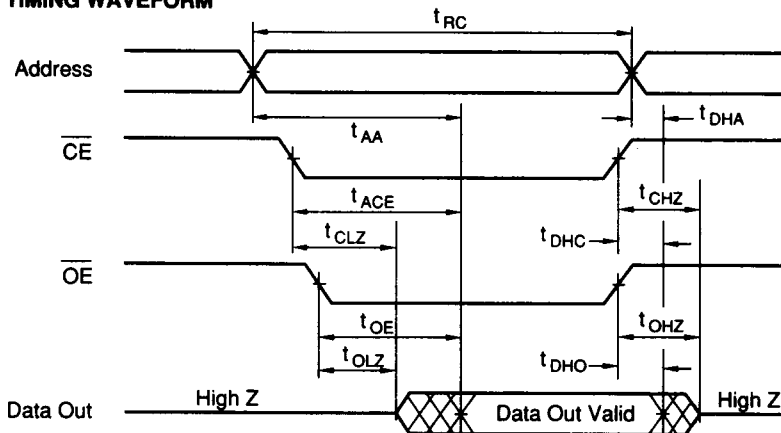
Test Conditions

- Input pulse levels: 0.8 V / 2.4 V
- Input rise and fall times:  $\leq 10$  ns
- Output load: 1 TTL Gate + CL = 100 pF (Including jig capacitance)
- Input/Output Timing Reference level: 1.5 V

| Item                                  | Symbol      | HN62315B-15 |      | HN62315B-20 |      | Unit |
|---------------------------------------|-------------|-------------|------|-------------|------|------|
|                                       |             | Min.        | Max. | Min.        | Max. |      |
| Read Cycle Time                       | $t_{RC}$    | 150         | -    | 200         | -    | ns   |
| Address Access Time                   | $t_{AA}$    | -           | 150  | -           | 200  | ns   |
| $\overline{CE}$ Access Time           | $t_{ACE}$   | -           | 150  | -           | 200  | ns   |
| $\overline{OE}$ Access Time           | $t_{OE}$    | -           | 70   | -           | 100  | ns   |
| Output Hold Time from Address Change  | $t_{DHA}$   | 0           | -    | 0           | -    | ns   |
| Output Hold Time from $\overline{CE}$ | $t_{DHC}$   | 0           | -    | 0           | -    | ns   |
| Output Hold Time from $\overline{OE}$ | $t_{DHO}$   | 0           | -    | 0           | -    | ns   |
| $\overline{CE}$ to Output in High Z   | $t_{CHZ}^1$ | -           | 70   | -           | 70   | ns   |
| $\overline{OE}$ to Output in High Z   | $t_{OHZ}^1$ | -           | 70   | -           | 70   | ns   |
| $\overline{CE}$ to Output in Low Z    | $t_{CLZ}$   | 10          | -    | 10          | -    | ns   |
| $\overline{OE}$ to Output in Low Z    | $t_{OLZ}$   | 10          | -    | 10          | -    | ns   |

Note: 1.  $t_{CHZ}$  and  $t_{OHZ}$  define the time at which the output becomes an open circuit and are not referenced to output voltage levels.

■ READ TIMING WAVEFORM



(TD.R.HN62315B)

- Note:
1.  $t_{DHA}$ ,  $t_{DHC}$ ,  $t_{DHO}$  are determined by the faster time.
  2.  $t_{AA}$ ,  $t_{ACE}$ ,  $t_{OE}$  are determined by the slower time.
  3.  $t_{CLZ}$ ,  $t_{OLZ}$  are determined by the slower time.

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