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# HN62W454B Series

262144-word × 16-bit CMOS Mask Programmable ROM

# HITACHI

ADE-203-682 (Z)  
Preliminary Rev. 0.0  
Nov. 18, 1996

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## Description

The HN62W454B is a 262144 words by 16 bits CMOS Mask Programmable ROM. A high speed access of 120/150 ns (max) is the most suitable to the system using a high speed micro-computer by 16 bits.

## Features

- Low voltage operation: 3.3 V ± 0.3 V
- High speed
  - Access time: 120/150 ns (max)
- Low power
  - Active: 216 mW (max)
  - Standby: 108 μW (max)
- Directly LVTTTL compatible
- All inputs and outputs

## Ordering Information

| Type No.       | Access time | Package                            |
|----------------|-------------|------------------------------------|
| HN62W454BP-12  | 120 ns      | 600 mil 40-pin plastic DIP (DP-40) |
| HN62W454BP-15  | 150 ns      |                                    |
| HN62W454BCP-12 | 120 ns      | 44-pin plastic PLCC (CP-44)        |
| HN62W454BCP-15 | 150 ns      |                                    |

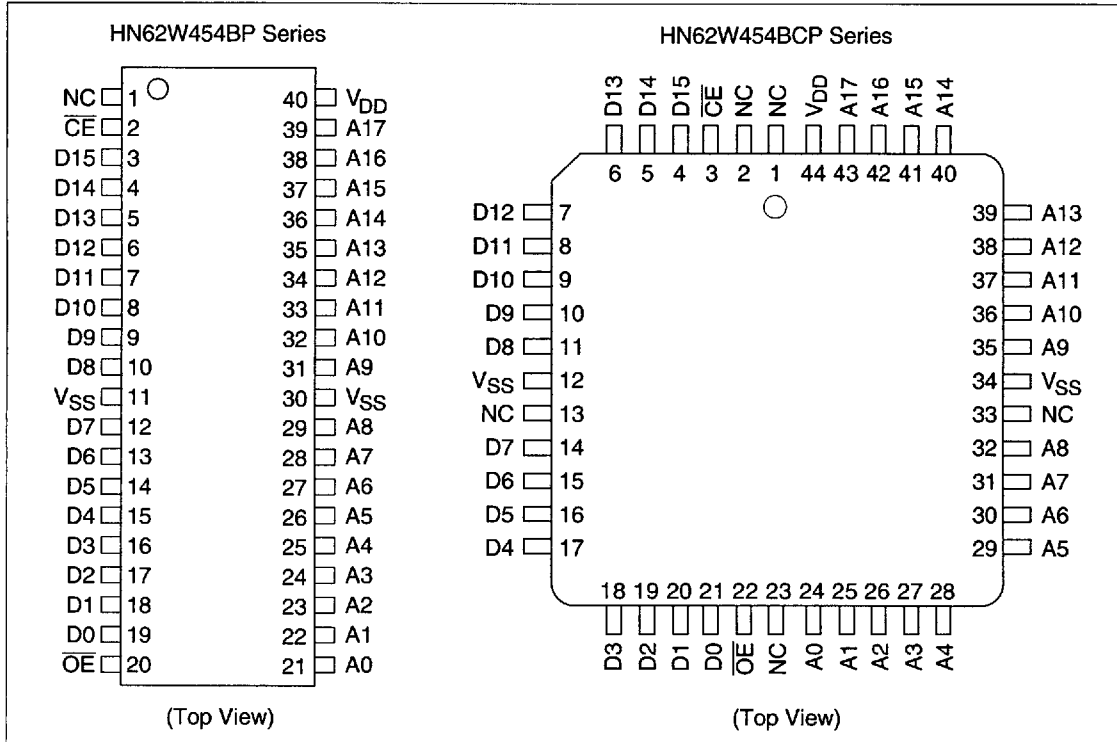
Preliminary: The specification of this device are subject to change without notice. Please contact your nearest Hitachi's Sales Dept. regarding specification.

**Hitachi**  
semiconductor 

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## HN62W454B Series

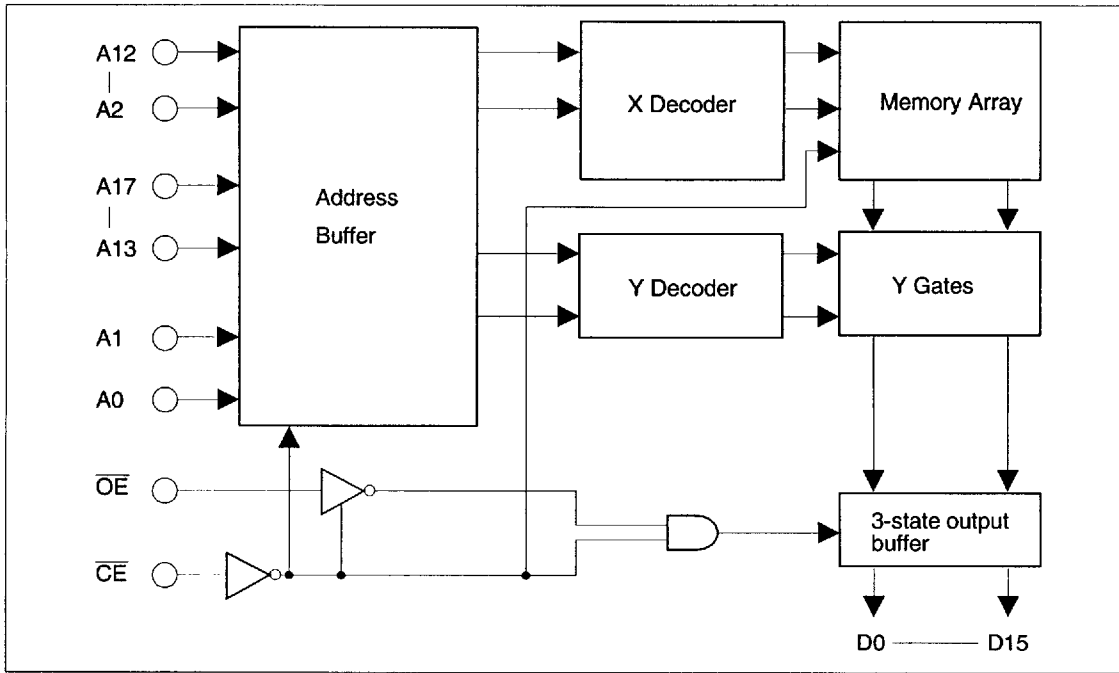
### Pin Arrangement



### Pin Description

| Pin name        | Function       |
|-----------------|----------------|
| A0 to A17       | Address inputs |
| D0 to D15       | Data outputs   |
| $\overline{CE}$ | Chip enable    |
| $\overline{OE}$ | Output enable  |
| NC              | No connection  |
| V <sub>DD</sub> | Power supply   |
| V <sub>SS</sub> | Ground         |

**Block Diagram**



**Mode Selection**

| Mode           | Pin |                 | Data output          | Address input |     |
|----------------|-----|-----------------|----------------------|---------------|-----|
|                | CE  | OE              |                      | LSB           | MSB |
| Standby        | H   | x <sup>*1</sup> | High-Z <sup>*2</sup> | —             | —   |
| Output disable | L   | H               | High-Z <sup>*2</sup> | —             | —   |
| Read           | L   | L               | Dout                 | A0            | A17 |

Notes: 1. x: Don't care.  
2. High-Z: High impedance

## HN62W454B Series

### Absolute Maximum Ratings

| Parameter                     | Symbol            | Value                  | Unit |
|-------------------------------|-------------------|------------------------|------|
| Supply voltage*               | $V_{DD}$          | -0.3 to + 5.5          | V    |
| All input and output voltage* | $V_{in}, V_{out}$ | -0.3 to $V_{DD} + 0.3$ | 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   |

Note: \* With respect to  $V_{SS}$ .

### Recommended DC Operating Conditions ( $T_a = 0$ to + 70°C)

| Parameter      | Symbol   | Min  | Typ | Max            | Unit |
|----------------|----------|------|-----|----------------|------|
| Supply voltage | $V_{DD}$ | 3.0  | 3.3 | 3.6            | V    |
|                | $V_{SS}$ | 0    | 0   | 0              | V    |
| Input voltage  | $V_{IH}$ | 2.2  | —   | $V_{DD} + 0.3$ | V    |
|                | $V_{IL}$ | -0.3 | —   | 0.8            | V    |

### DC Characteristics ( $V_{DD} = 3.3 \text{ V} \pm 0.3 \text{ V}$ , $V_{SS} = 0 \text{ V}$ , $T_a = 0$ to + 70°C)

| Parameter              |         | Symbol     | Min | Max   | Unit          | Test conditions  |
|------------------------|---------|------------|-----|-------|---------------|--|
| Supply current         | Active  | $I_{DD}$   | —   | 60/50 | mA            | $V_{DD} = 3.6 \text{ V}$ , $I_{DOUT} = 0 \text{ mA}$ , $t_{RC} = 120/150 \text{ ns}$ |
|                        | Standby | $I_{SB1}$  | —   | 30    | $\mu\text{A}$ | $V_{DD} = 3.6 \text{ V}$ , $\overline{CE} \geq V_{DD} - 0.2 \text{ V}$               |
|                        | Standby | $I_{SB2}$  | —   | 3     | mA            | $V_{DD} = 3.6 \text{ V}$ , $\overline{CE} \geq 2.2 \text{ V}$                        |
| Input leakage current  |         | $ I_{IL} $ | —   | 10    | $\mu\text{A}$ | $V_{in} = 0$ to $V_{DD}$   |
| Output leakage current |         | $ I_{OL} $ | —   | 10    | $\mu\text{A}$ | $\overline{CE} = 2.2 \text{ V}$ , $V_{out} = 0$ to $V_{DD}$                          |
| Output voltage         |         | $V_{OH}$   | 2.4 | —     | V             | $I_{OH} = -2.0 \text{ mA}$   |
|                        |         | $V_{OL}$   | —   | 0.4   | V             | $I_{OL} = 2.0 \text{ mA}$  |

### Capacitance ( $V_{DD} = 3.3 \text{ V} \pm 0.3 \text{ V}$ , $V_{SS} = 0 \text{ V}$ , $T_a = 25^\circ\text{C}$ , $V_{in} = 0 \text{ V}$ , $f = 1\text{MHz}$ )

| Parameter           | Symbol    | Min | Max | Unit |
|---------------------|-----------|-----|-----|------|
| Input capacitance*  | $C_{in}$  | —   | 10  | pF   |
| Output capacitance* | $C_{out}$ | —   | 15  | pF   |

Note: \* This parameter is sampled and not 100% tested.

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### AC Characteristics ( $V_{DD} = 3.3 \text{ V} \pm 0.3 \text{ V}$ , $V_{SS} = 0 \text{ V}$ , $T_a = 0 \text{ to } +70^\circ\text{C}$ )

- Output load: 1TTL +  $C_L = 100 \text{ pF}$  (including jig)
- Input pulse level: 0.4 to 2.4 V
- Input and output timing reference levels: 1.4 V
- Input rise and fall time: 5 ns

| Parameter                             | Symbol    | HN62W454B-12 |     | HN62W454B-15 |     | Unit | Note |
|---------------------------------------|-----------|--------------|-----|--------------|-----|------|------|
|                                       |           | Min          | Max | Min          | Max |      |      |
| Read cycle time                       | $t_{RC}$  | 120          | —   | 150          | —   | ns   |      |
| Address access                        | $t_{AA}$  | —            | 120 | —            | 150 | ns   |      |
| $\overline{CE}$ access time           | $t_{ACE}$ | —            | 120 | —            | 150 | ns   |      |
| $\overline{OE}$ access time           | $t_{OE}$  | —            | 60  | —            | 70  | 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   | $t_{CHZ}$ | —            | 50  | —            | 60  | ns   | 1    |
| $\overline{OE}$ to output in high-Z   | $t_{OHZ}$ | —            | 50  | —            | 60  | ns   | 1    |
| $\overline{CE}$ to output in low-Z    | $t_{CLZ}$ | 5            | —   | 5            | —   | ns   |      |
| $\overline{OE}$ to output in low-Z    | $t_{OLZ}$ | 5            | —   | 5            | —   | ns   |      |

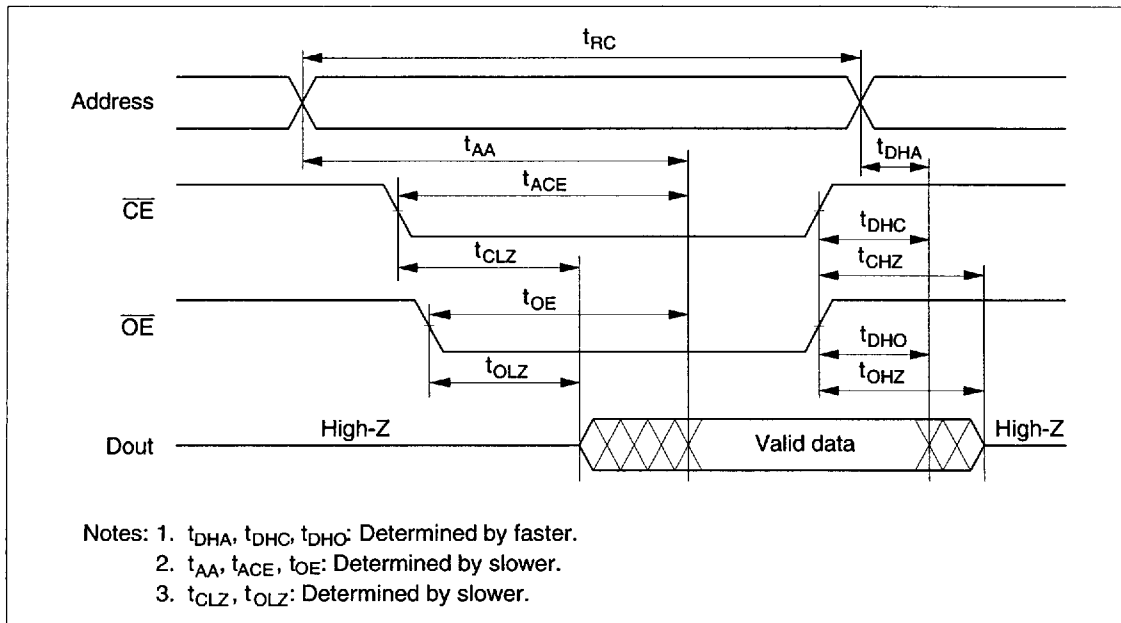
Note: 1.  $t_{CHZ}$  and  $t_{OHZ}$  are defined as the time at which the output achieves the open circuit conditions and are not referred to output voltage levels.

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### Timing Waveform

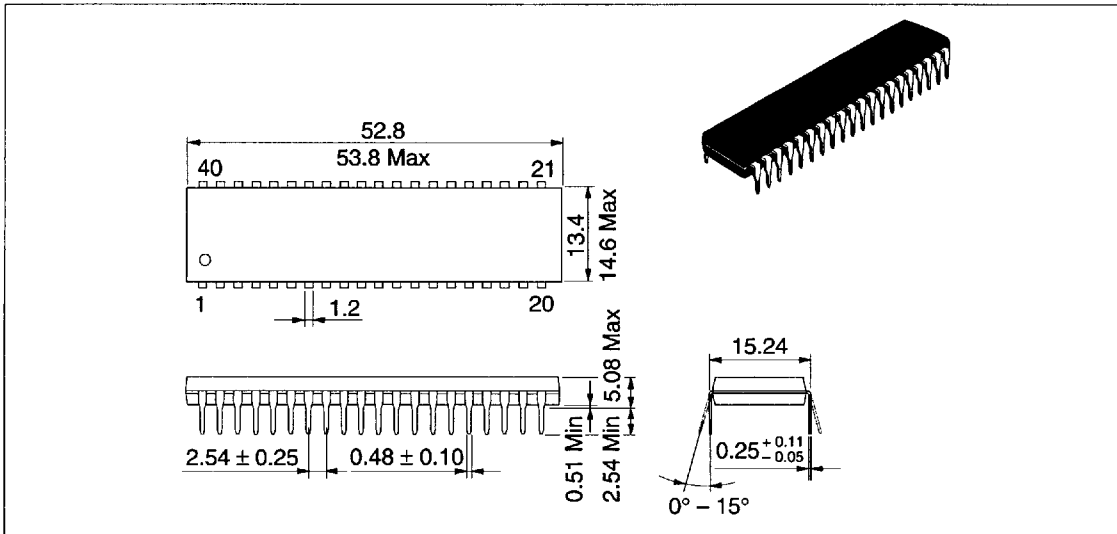


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## Package Dimensions

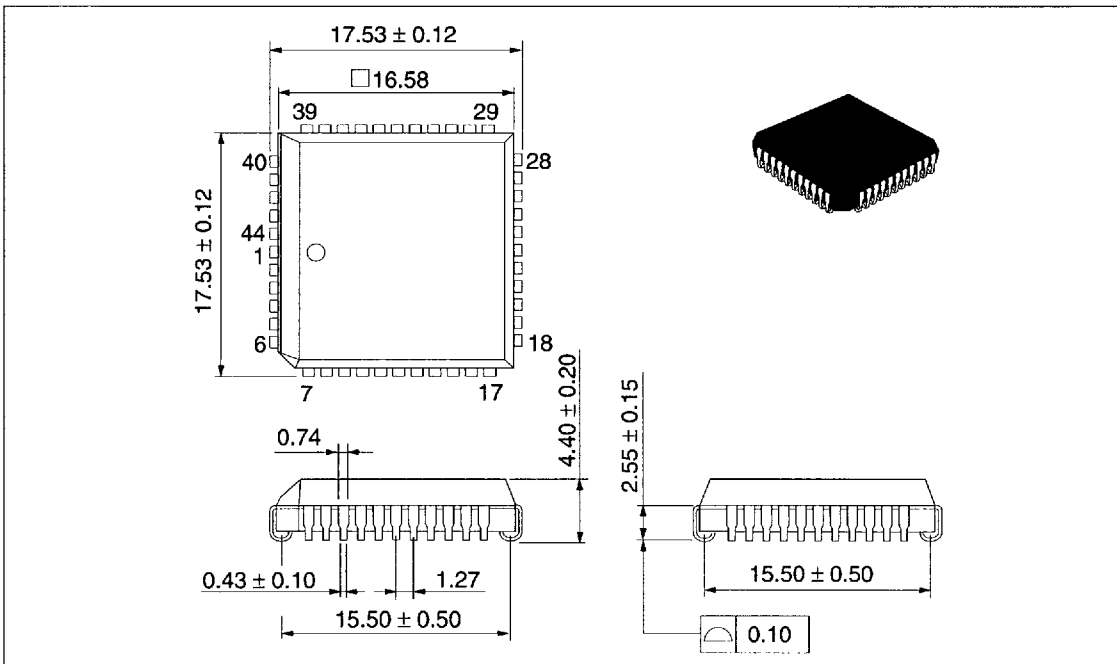
HN62W454BP Series (DP-40)

Unit: mm



HN62W454BCP Series (CP-44)

Unit: mm



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## HN62W454B Series

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**HN62W454B Series**

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**Revision Record**

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| <b>Rev.</b> | <b>Date</b>   | <b>Contents of Modification</b> | <b>Drawn by</b> | <b>Approved by</b> |
|-------------|---------------|---------------------------------|-----------------|--------------------|
| 0.0         | Nov. 18, 1996 | Initial issue                   |                 |                    |

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