
HN62435 Series

262144-word × 16-bit/524288-word × 8-bit CMOS Mask
Programmable ROM

HITACHI

ADE-203-472A(Z)
Rev. 1.0
Nov. 16, 1995

Description

The HN62435 is a 4-Mbit CMOS mask-Programmable ROM organized either as 262144 words by 16 bits or 524288 words by 8 bits. Realizing a access speed of 120/150 ns (max) depend upon technology of a high speed circuit.

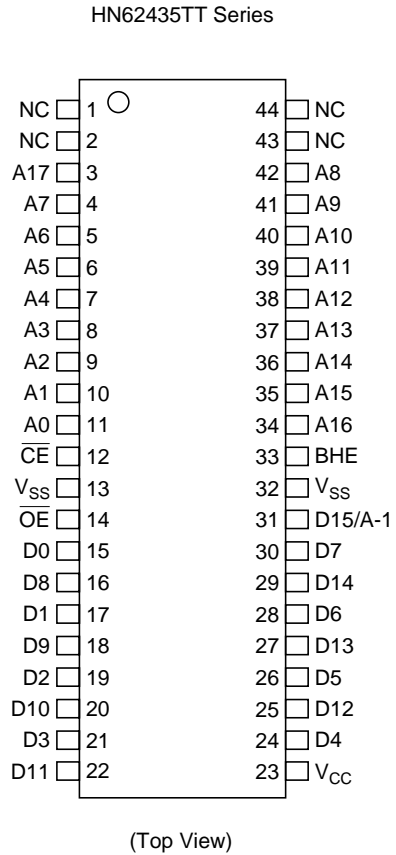
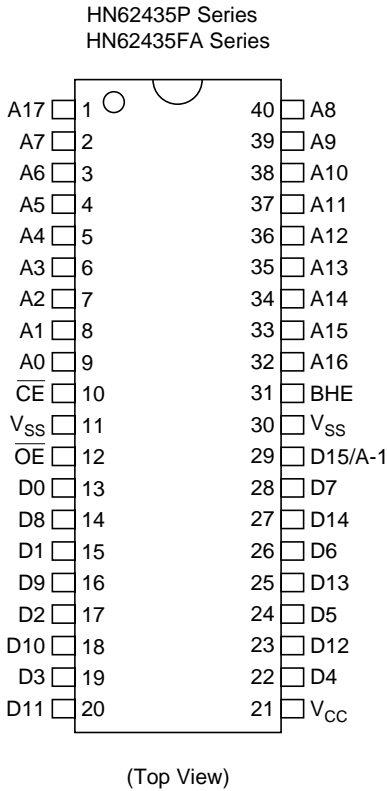
Features

- Single 5 V supply
- High speed
Access time: 120/150 ns (max)
- Low power
Active: 275 mW (max)
Standby: 165 μ W (max)
- Byte-wide or word-wide data organization (Switched by BHE terminal)
- Three-state data output for or-tying
- Directly TTL compatible
All inputs and outputs
- Pin compatible with 4 Mbit EPROM (HN27C4000G/FP)

Ordering Information

| Type No. | Access time | Package |
|--------------|-------------|--|
| HN62435P-12 | 120 ns | 600 mil 40-pin plastic DIP (DP-40) |
| HN62435P-15 | 150 ns | |
| HN62435FA-12 | 120 ns | 525 mil 40-pin plastic SOP (FP-40D) |
| HN62435FA-15 | 150 ns | |
| HN62435TT-12 | 120 ns | 400 mil 44-pin plastic TSOP II (TTP-44D) |
| HN62435TT-15 | 150 ns | |

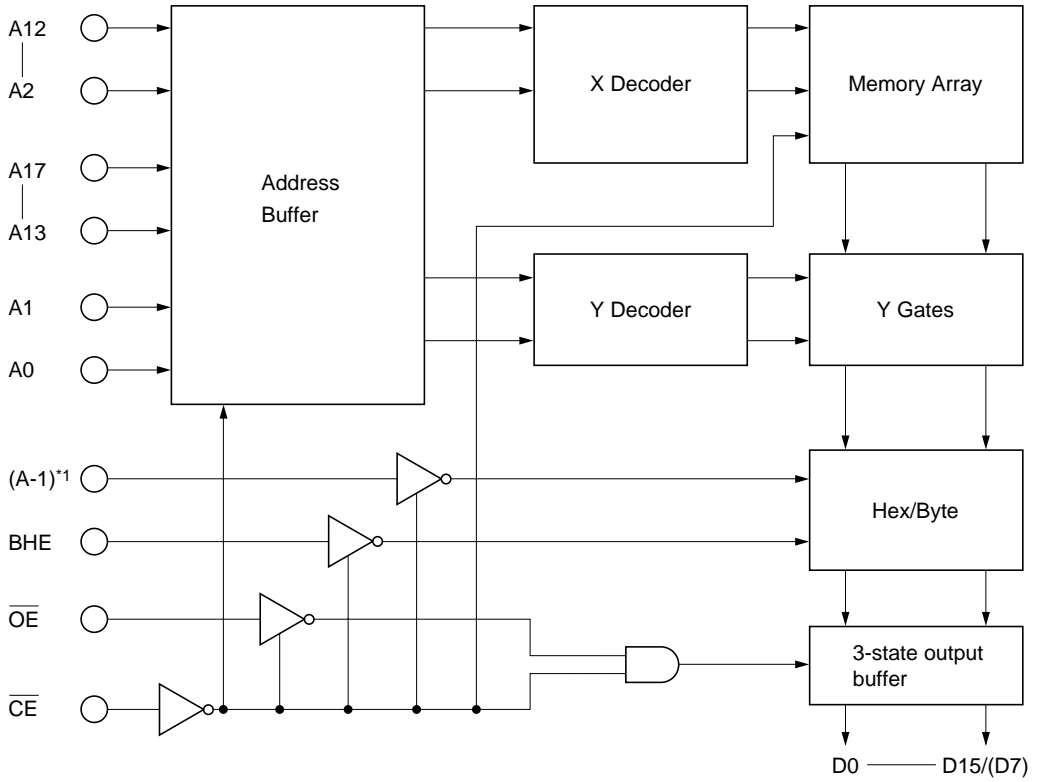
Pin Arrangement



Pin Description

| Pin name | Function |
|------------------------|----------------------------------|
| A-1, A0 to A17 | Address inputs |
| D0 to D15 | Data outputs |
| BHE | 8/16 bit (byte/word) mode switch |
| $\overline{\text{CE}}$ | Chip enable |
| $\overline{\text{OE}}$ | Output enable |
| NC | No connection |
| V_{CC} | Power supply |
| V_{SS} | Ground |

Block Diagram



BHE = V_{IH} : 16-bit (D15 to D0)
 BHE = V_{IL} : 8-bit (D7 to D0)

Note : 1. A-1 is least significant address.
 When BHE is 'low', D14 to D8 goes the high impedance state, and D15 should be A-1.

Mode Selection

| Mode | Pin | | | | Data output | | Address input | |
|----------------|-----------------|-----------------|----------------|---------|-------------|---------------------|---------------|-----|
| | \overline{CE} | \overline{OE} | BHE | D15/A-1 | D0-D7 | D8-D15 | LSB | MSB |
| | Standby | H | x ¹ | x | x | High-Z ² | High-Z | — |
| Output disable | L | H | x | x | High-Z | High-Z | — | — |
| Read (16-bit) | L | L | H | Dout | D0 to D7 | D8 to D15 | A0 | A17 |
| Read (8-bit) | L | L | L | L | D0 to D7 | High-Z | A-1 | A17 |
| Read (8-bit) | L | L | L | H | D8 to D15 | High-Z | A-1 | A17 |

Notes: 1. x: Don't care.

2. High-Z: High impedance

Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|-------------------|------------------------|------|
| Supply voltage ¹ | V_{CC} | -0.3 to +7.0 | V |
| All input and output voltage ¹ | V_{in}, V_{out} | -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 |

Note: 1. With respect to V_{SS} .

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

| Parameter | Symbol | Min | Typ | Max | Unit |
|----------------|----------|------|-----|----------------|------|
| Supply voltage | V_{CC} | 4.5 | 5.0 | 5.5 | V |
| | V_{SS} | 0 | 0 | 0 | V |
| Input voltage | V_{IH} | 2.2 | — | $V_{CC} + 0.3$ | V |
| | V_{IL} | -0.3 | — | 0.8 | V |

DC Characteristics ($V_{CC} = 5.0 \text{ V} \pm 10\%$, $V_{SS} = 0 \text{ V}$, $T_a = 0 \text{ to } +70^\circ\text{C}$)

| Parameter | | Symbol | Min | Max | Unit | Test conditions |
|------------------------|---------|------------|-----|-----|---------------|--|
| Supply current | Active | I_{CC} | — | 50 | mA | $V_{CC} = 5.5 \text{ V}$, $I_{DOUT} = 0 \text{ mA}$, $t_{RC} = \text{min}$ |
| | Standby | I_{SB1} | — | 30 | μA | $V_{CC} = 5.5 \text{ V}$, $\overline{CE} \geq V_{CC} - 0.2 \text{ V}$ |
| | Standby | I_{SB2} | — | 3 | mA | $V_{CC} = 5.5 \text{ V}$, $\overline{CE} \geq 2.2 \text{ V}$ |
| Input leakage current | | $ I_{IL} $ | — | 10 | μA | $V_{in} = 0 \text{ to } V_{CC}$ |
| Output leakage current | | $ I_{OL} $ | — | 10 | μA | $\overline{CE} = 2.2 \text{ V}$, $V_{out} = 0 \text{ to } V_{CC}$ |
| Output voltage | | V_{OH} | 2.4 | — | V | $I_{OH} = -205 \mu\text{A}$ |
| | | V_{OL} | — | 0.4 | V | $I_{OL} = 1.6 \text{ mA}$ |

Capacitance ($V_{CC} = 5.0 \text{ V} \pm 10\%$, $V_{SS} = 0 \text{ V}$, $T_a = 25^\circ\text{C}$, $V_{in} = 0 \text{ V}$, $f = 1\text{MHz}$)

| Parameter | | Symbol | Min | Max | Unit |
|----------------------------------|--|-----------|-----|-----|------|
| Input capacitance ^{*1} | | C_{in} | — | 10 | pF |
| Output capacitance ^{*1} | | C_{out} | — | 15 | pF |

Note: 1. This parameter is sampled and not 100% tested. D15/A-1 pin is output.

HN62435 Series

AC Characteristics ($V_{CC} = 5.0 \text{ V} \pm 10\%$, $V_{SS} = 0 \text{ V}$, $T_a = 0 \text{ to } +70^\circ\text{C}$)

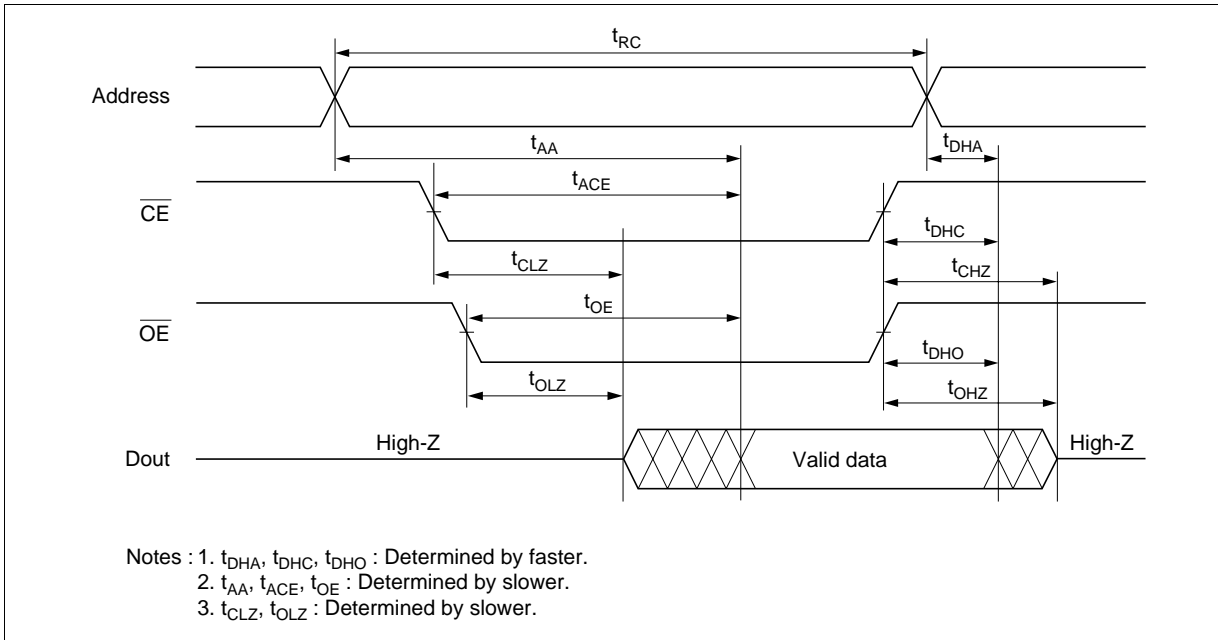
- Output load: 1TTL + $C_L = 100 \text{ pF}$ (including jig)
- Input pulse level: 0.6 to 2.4 V
- Input and output timing reference levels: 1.5 V
- Input rise and fall time: 5 ns

| Parameter | Symbol | HN62435-12 | | HN62435-15 | | Unit | Note |
|---------------------------------------|-----------|------------|-----|------------|-----|------|------|
| | | Min | Max | Min | Max | | |
| Read cycle time | t_{RC} | 120 | — | 150 | — | ns | |
| Address access time | t_{AA} | — | 120 | — | 150 | ns | |
| \overline{CE} access time | t_{ACE} | — | 120 | — | 150 | ns | |
| \overline{OE} access time | t_{OE} | — | 60 | — | 70 | ns | |
| BHE access time | t_{BHE} | — | 120 | — | 150 | 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 | |
| Output hold time from BHE | t_{DHB} | 0 | — | 0 | — | ns | |
| \overline{CE} to output in high-Z | t_{CHZ} | — | 60 | — | 70 | ns | 1 |
| \overline{OE} to output in high-Z | t_{OHZ} | — | 60 | — | 70 | ns | 1 |
| BHE to output in high-Z | t_{BHZ} | — | 60 | — | 70 | 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 | |
| BHE to output in low-Z | t_{BLZ} | 5 | — | 5 | — | ns | |

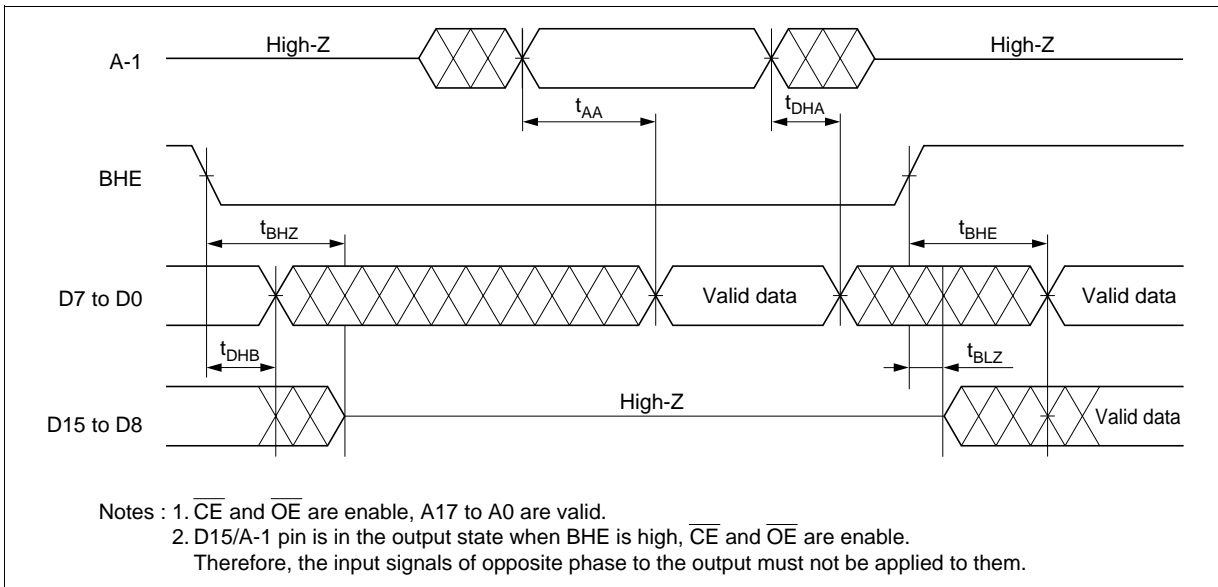
Note: 1. t_{CHZ} , t_{OHZ} and t_{BHZ} are defined as the time at which the output achieves the open circuit conditions and are not referred to output voltage levels.

Timing Waveforms

Word Mode (BHE = 'V_{IH}') or Byte Mode (BHE = 'V_{IL}')



Word Mode, Byte Mode Switch

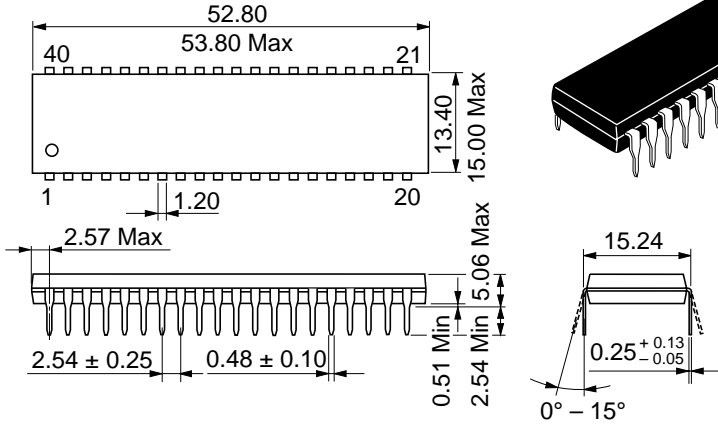


HN62435 Series

Package Dimensions

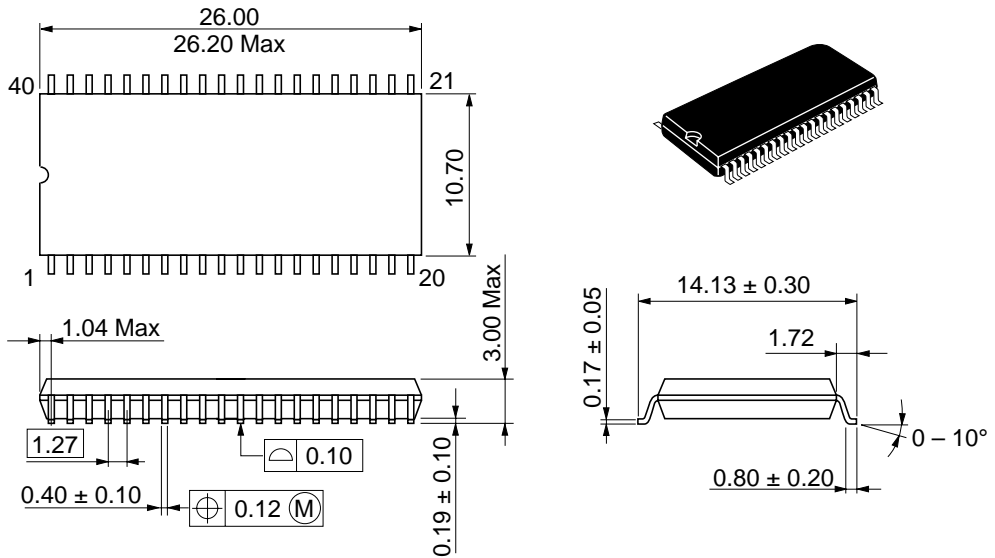
HN62435P Series (DP-40)

Unit: mm



HN62435FA Series (FP-40D)

Unit: mm



Package Dimensions (cont)

HN62435TT Series (TTP-44D)

Unit: mm

