

HN62W4416N Series

1048576-word $\times$ 16-bit/2097152-word $\times$ 8-bit CMOS Mask
Programmable ROM

HITACHI

ADE-203-468 (Z)
Preliminary
Rev. 0.0
Nov. 20, 1995

Description

The HN62W4416N is a 16-Mbit CMOS mask-Programmable ROM organized either as 1048576 words by 16 bits or 2097152 words by 8 bits. Realizing low power consumption, this memory is allowed for battery operation. And a high speed access of 150 ns (max) is the most suitable to the system using a high speed micro-computer by 16 bits.

Feature

- Low voltage operation Mask ROM
Single 3.3 V supply
- High speed
Normal access time: 150 ns (max)
Page access time: 50 ns (max)
- Low power
Active: 252 mW (max)
Standby: 108 μ W (max)
- Byte-wide or word-wide data organization (Switched by BHE terminal)
- 4 word page access on word-wide mode
- 8 byte page access on byte-wide mode
- Three-state data output for or-tying
- Directly LVTTL compatible
All inputs and outputs

Ordering Information

Type No.	Access time	Package
HN62W4416NP-15	150 ns	600 mil 42-pin plastic DIP (DP-42)
HN62W4416NFB-15	150 ns	600 mil 44-pin plastic SOP (FP-44D)
HN62W4416NTT-15	150 ns	400 mil 44-pin plastic TSOP II (TTP-44D)

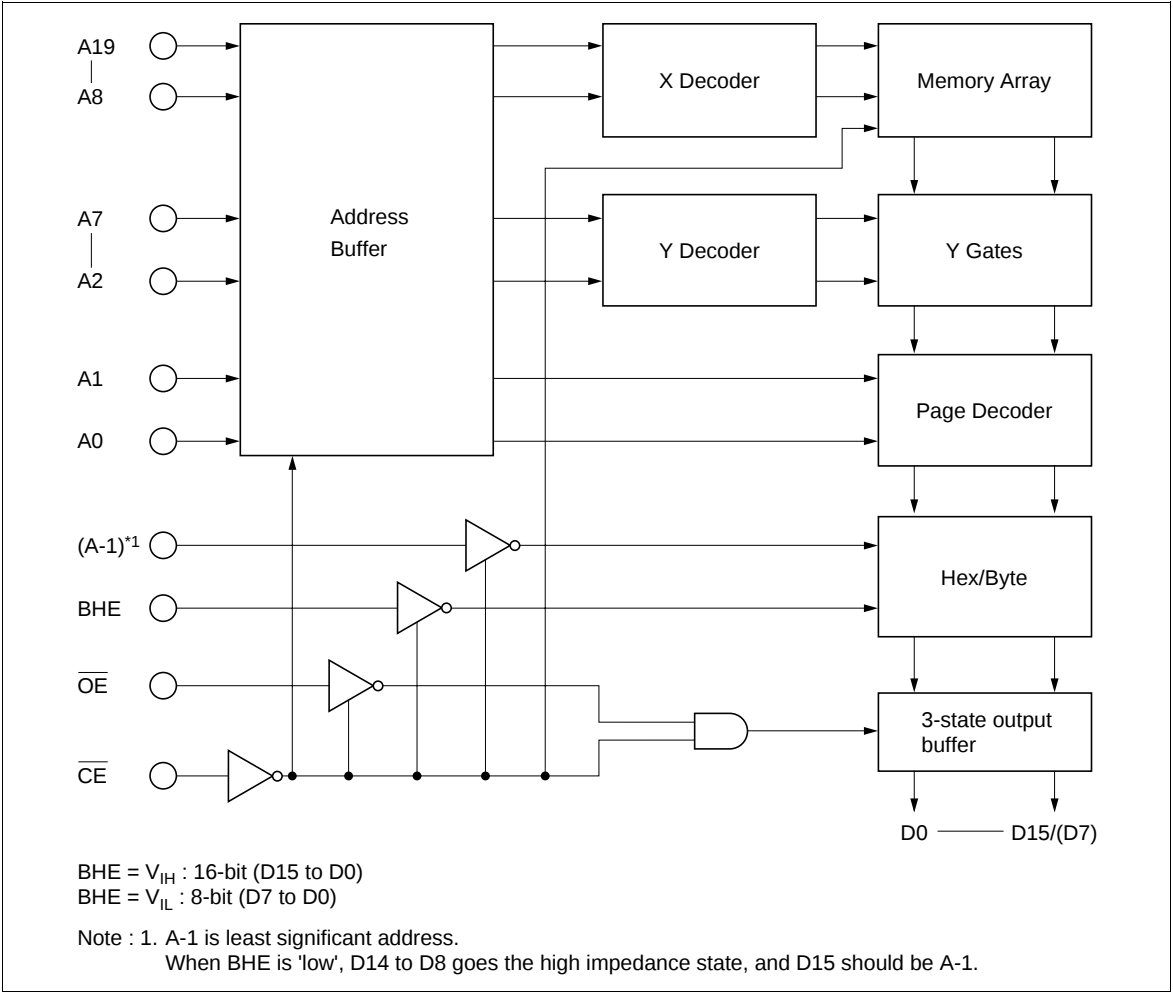
Preliminary: This document contains information on a product. Specifications and information contained herein are subject to change without notice.

Pin Arrangement



Pin name	Function
A2 to A19	Address inputs
D0 to D15	Data outputs
BHE	8/16 bit (byte/word) mode switch
A-1, A0 , A1	Page address inputs
BHE	8/16 bit (byte/word) mode switch
$\overline{CE}$	Chip enable
$\overline{OE}$	Output enable
NC	No connection
V_{DD}	Power supply
V_{SS}	Ground

Block Diagram



Mode Selection

Mode	Pin				Data output		Address input	
	$\overline{CE}$	$\overline{OE}$	BHE	D15/A-1	D0-D7	D8-D15	LSB	MSB
					D0-D7	D8-D15	A0	A19
Standby	H	$\times^{*1}$	$\times$	$\times$	High-Z ^{*2}	High-Z	—	—
Output disable	L	H	$\times$	$\times$	High-Z	High-Z	—	—
Read (16-bit)	L	L	H	Dout	D0 to D7	D8 to D15	A0	A19
Read (8-bit)	L	L	L	L	D0 to D7	High-Z	A-1	A19
Read (8-bit)	L	L	L	H	D8 to D15	High-Z	A-1	A19

Notes: 1. $\times$: Don't care.
2. High-Z: High impedance

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply voltage ^{*1}	V _{DD}	−0.3 to +5.5	V
All input and output voltage ^{*1}	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: 1. With respect to V_{SS}.

Recommended DC Operating Conditions (Ta = 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 V ± 0.3 V, V_{SS} = 0 V, Ta = 0 to + 70°C)

Parameter		Symbol	Min	Max	Unit	Test conditions
Supply current	Active	I _{DD}	—	70	mA	V _{DD} = 3.6 V, I _{DOUT} = 0 mA, t _{RC} = 150 ns
	Standby	I _{SB1}	—	30	μA	V _{DD} = 3.6 V, $\overline{CE} \geq V_{DD} - 0.2$ V
	Standby	I _{SB2}	—	3	mA	V _{DD} = 3.6 V, $\overline{CE} \geq 2.2$ V
Input leakage current		I _{IL}	—	10	μA	V _{in} = 0 to V _{DD}
Output leakage current		I _{OL}	—	10	μA	$\overline{CE} = 2.2$ V, V _{out} = 0 to V _{DD}
Output voltage		V _{OH}	2.4	—	V	I _{OH} = −2.0 mA
		V _{OL}	—	0.4	V	I _{OL} = 2.0 mA

Capacitance (V_{DD} = 3.3 V ± 0.3 V, V_{SS} = 0 V, Ta = 25°C, V_{in} = 0 V, f = 1MHz)

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.

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

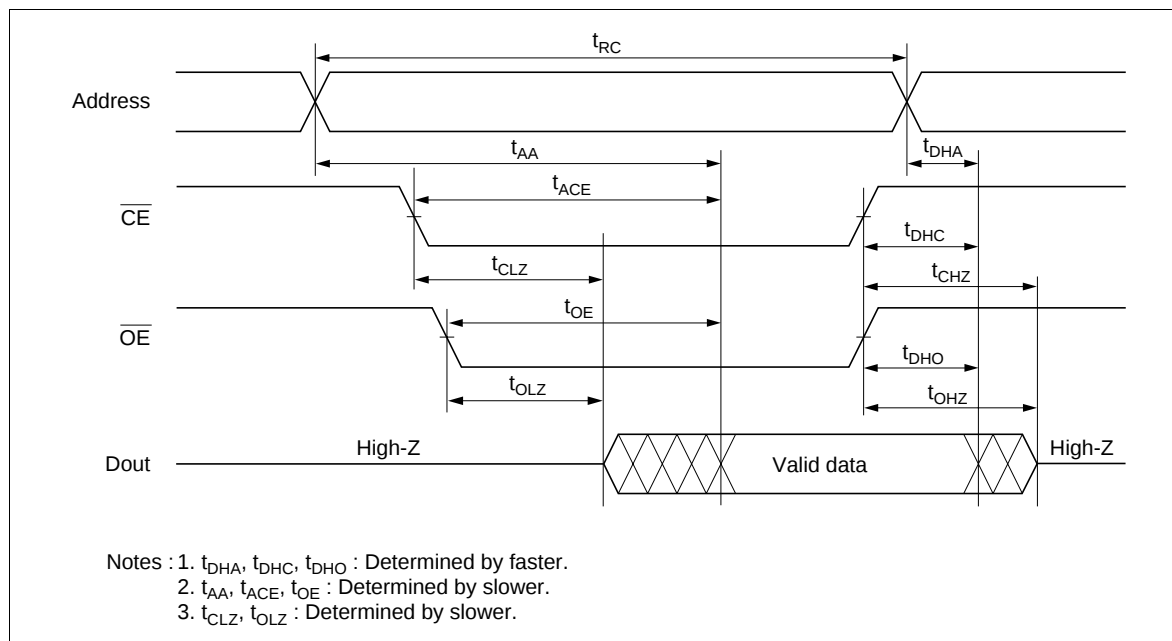
- Output load: 1TTL + $C_L = 100 \text{ pF}$ (including jig)
- Input pulse level: 0.4 to 2.4 V
- Input and output timing reference level: 1.4 V
- Input rise and fall time: 5 ns

Parameter	Symbol	HN62W4416N-15		Unit	Note
		Min	Max		
Read cycle time	t_{RC}	150	—	ns	
Page read cycle time	t_{PC}	50	—	ns	
Address access time	t_{AA}	—	150	ns	
Page address access time	t_{PA}	—	50	ns	
$\overline{CE}$ access time	t_{ACE}	—	150	ns	
$\overline{OE}$ access time	t_{OE}	—	50	ns	
BHE access time	t_{BHE}	—	150	ns	
Output hold time from address change	t_{DHA}	5	—	ns	
Output hold time from $\overline{CE}$	t_{DHC}	0	—	ns	
Output hold time from $\overline{OE}$	t_{DHO}	0	—	ns	
Output hold time from BHE	t_{DHB}	0	—	ns	
$\overline{CE}$ to output in high-Z	t_{CHZ}	—	50	ns	1
$\overline{OE}$ to output in high-Z	t_{OHZ}	—	50	ns	1
BHE to output in high-Z	t_{BHZ}	—	30	ns	1
$\overline{CE}$ to output in low-Z	t_{CLZ}	5	—	ns	
$\overline{OE}$ to output in low-Z	t_{OLZ}	5	—	ns	
BHE to output in low-Z	t_{BLZ}	5	—	ns	

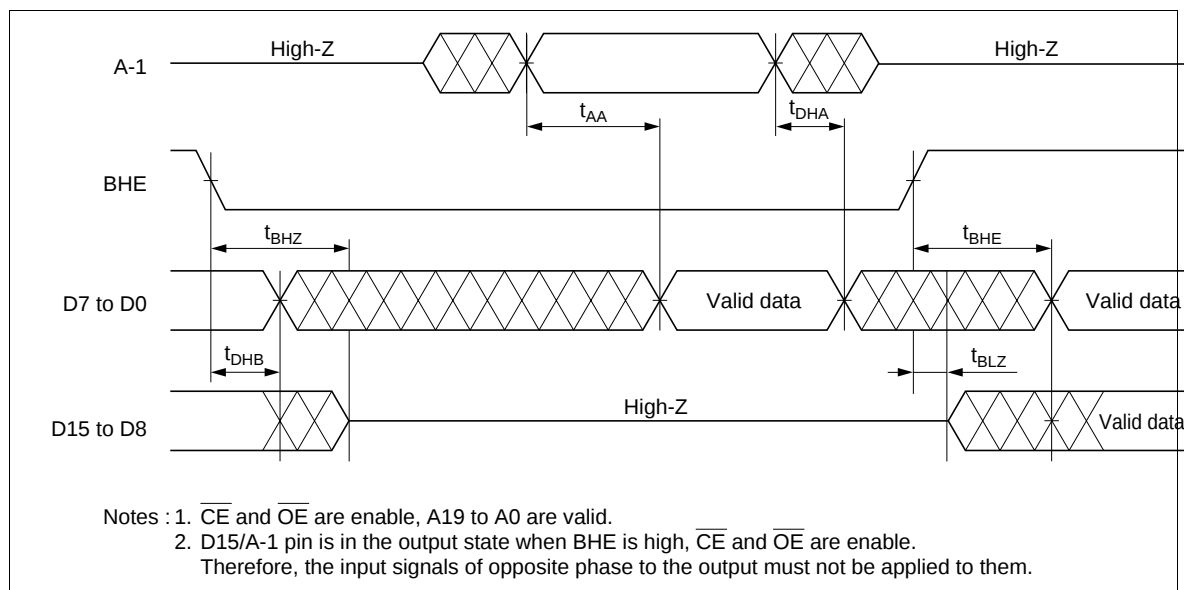
Note: 1. t_{CHZ} , t_{OHZ} and t_{BHZ} are defined as the time at which the output achieves the open circuit conditions and are not referred to output voltage levels.

Timing Waveforms

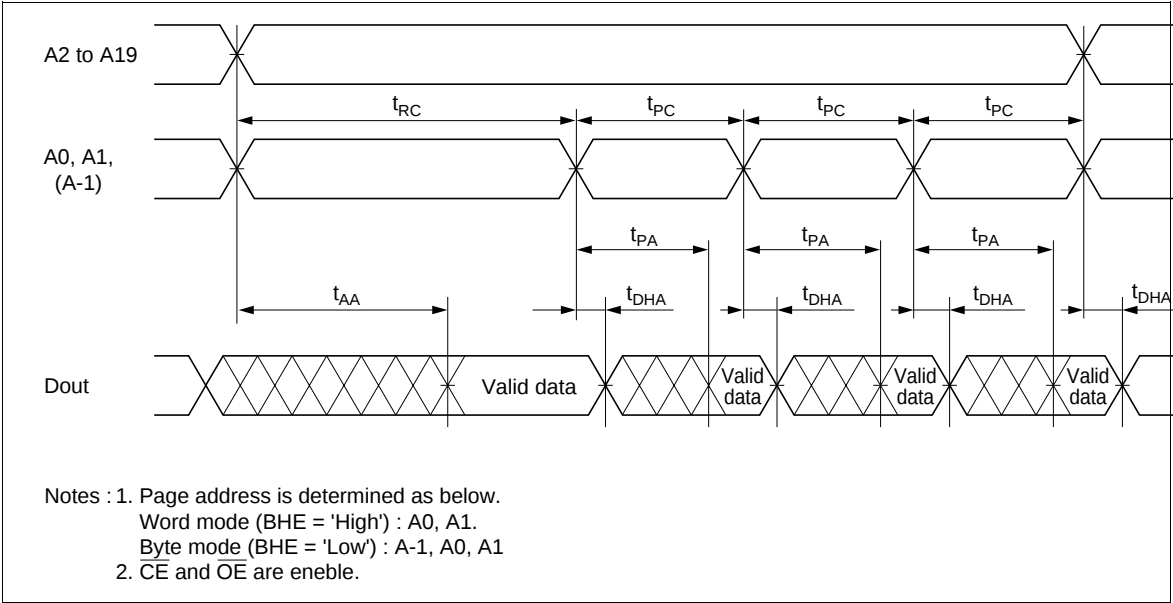
Word Mode (BHE = 'V_{HH}') or Byte Mode (BHE = 'V_{LL}')



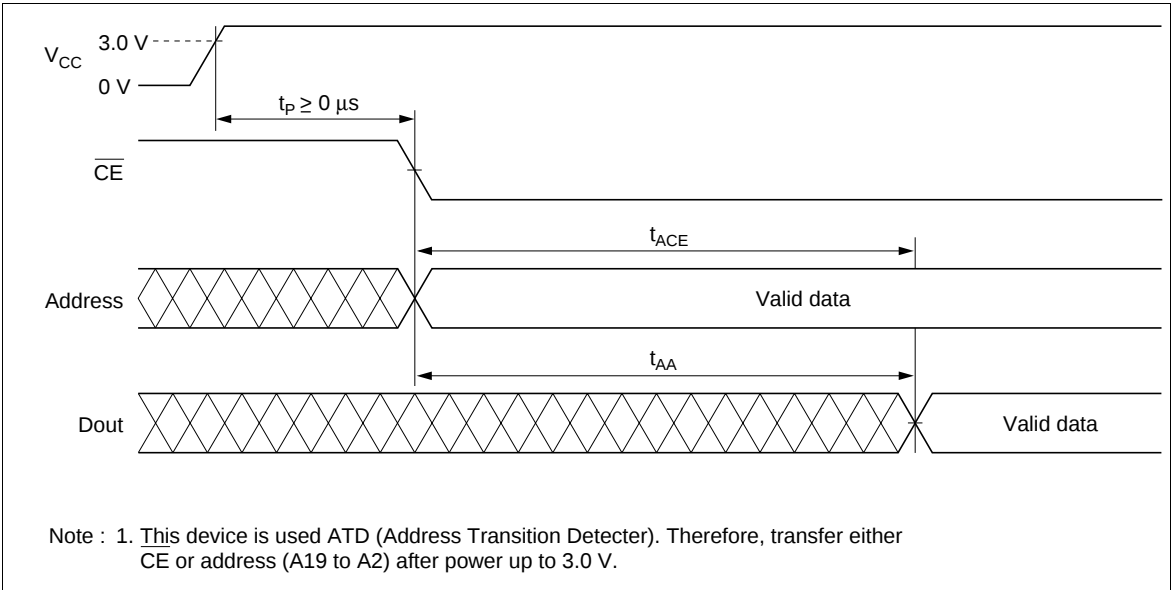
Word Mode, Byte Mode Switch



Page mode



Power Up Sequence

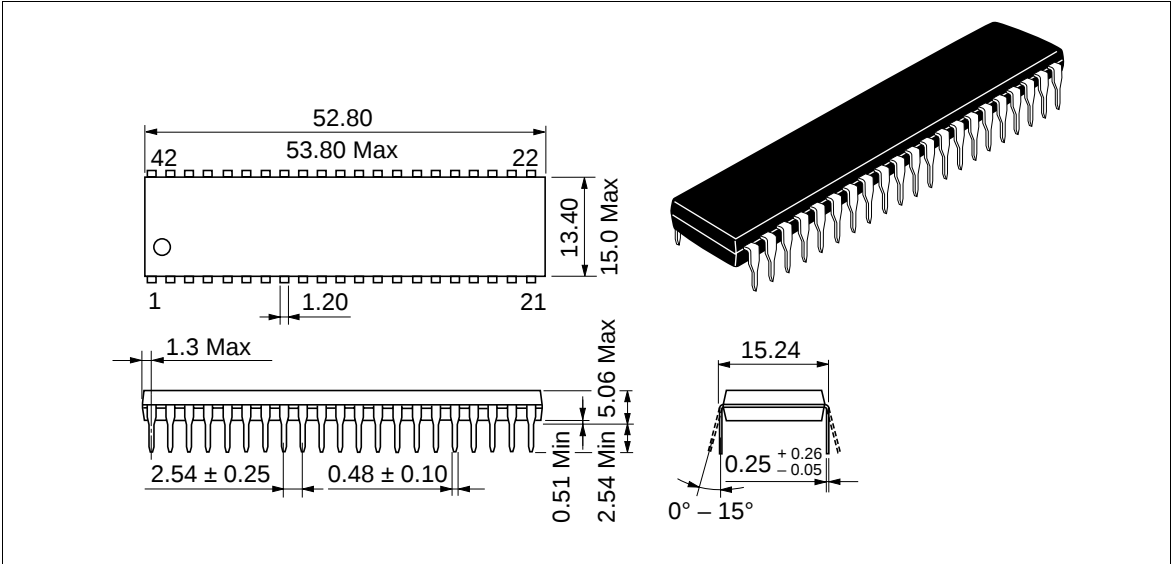


HN62W4416N Series

Package Dimensions

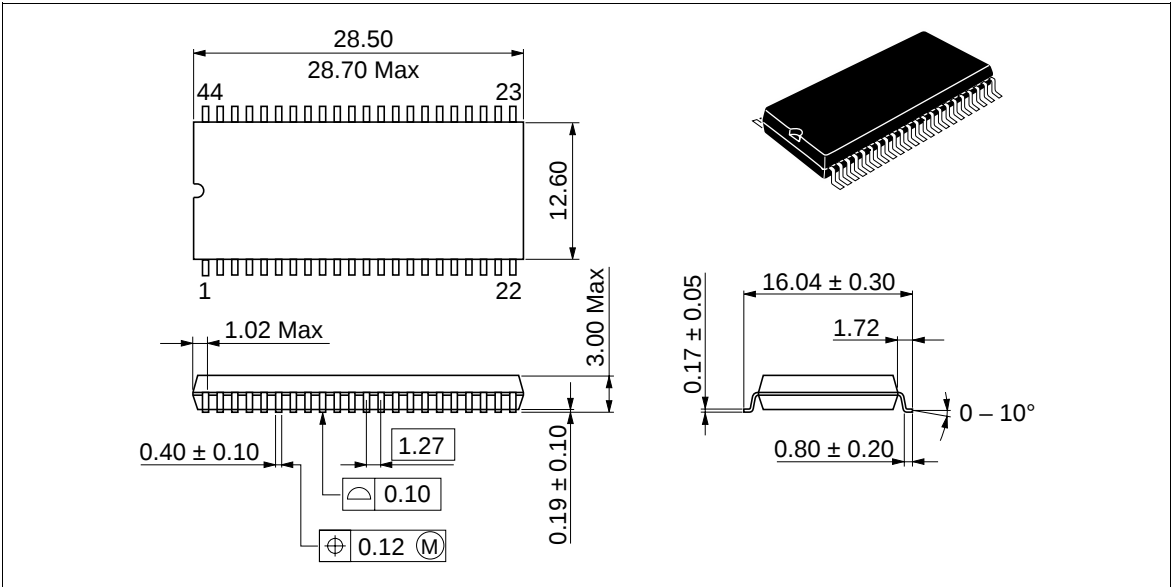
HN62W4416P Series (DP-42)

Unit: mm



HN62W4416FB Series (FP-44D)

Unit: mm



Package Dimensions (cont)

HN62W4416TT Series (TTP-44D)

Unit: mm

