

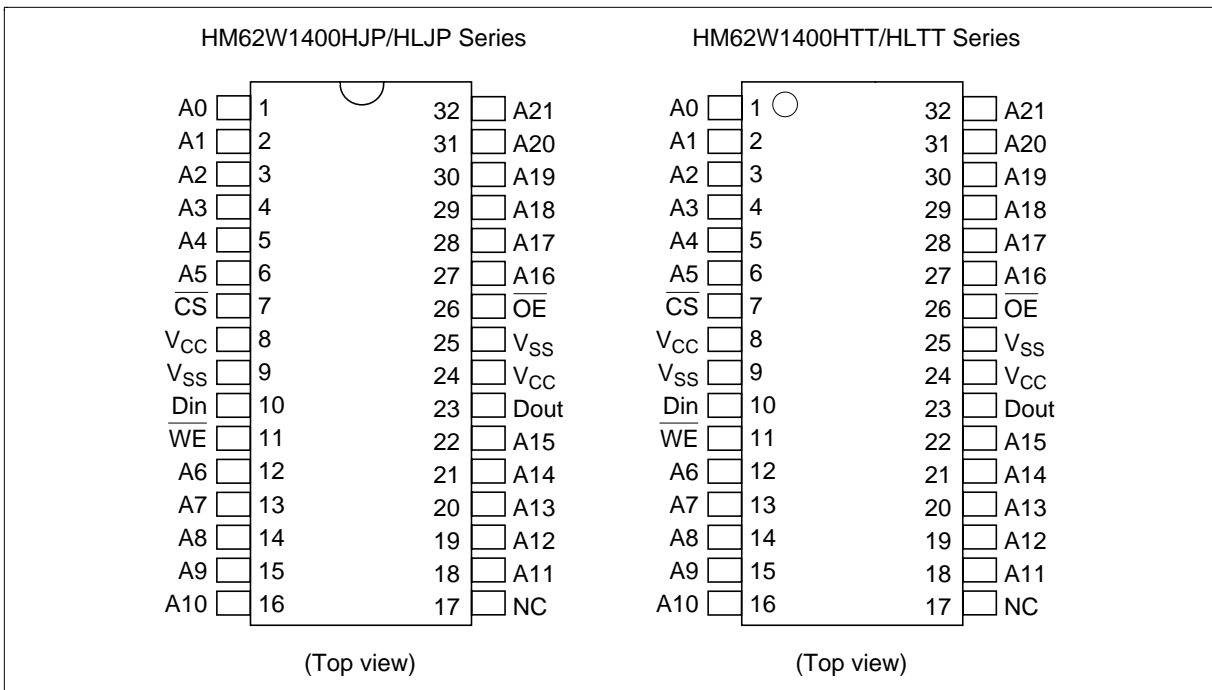


## HM62W1400H Series

### Ordering Information

Type No.	Access time	Package
HM62W1400HJP-12	12 ns	400-mil 32-pin plastic SOJ (CP-32DB)
HM62W1400HJP-15	15 ns	
HM62W1400HLJP-12	12 ns	400-mil 32-pin plastic TSOP II (TTP-32DC)
HM62W1400HLJP-15	15 ns	
HM62W1400HTT-12	12 ns	400-mil 32-pin plastic TSOP II (TTP-32DC)
HM62W1400HTT-15	15 ns	
HM62W1400HLTT-12	12 ns	400-mil 32-pin plastic TSOP II (TTP-32DC)
HM62W1400HLTT-15	15 ns	

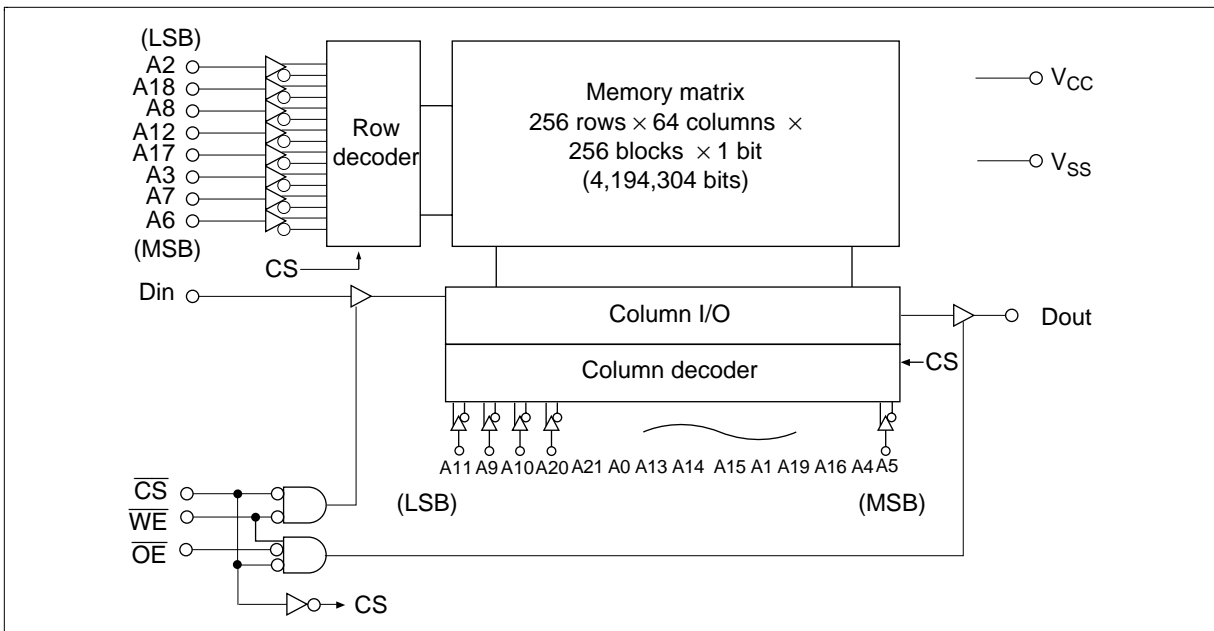
### Pin Arrangement



**Pin Description**

Pin name	Function
A0 to A21	Address input
Din	Data input
Dout	Data output
$\overline{CS}$	Chip select
$\overline{OE}$	Output enable
$\overline{WE}$	Write enable
$V_{CC}$	Power supply
$V_{SS}$	Ground
NC	No connection

**Block Diagram**



## HM62W1400H Series

### Operation Table

$\overline{\text{CS}}$	$\overline{\text{OE}}$	$\overline{\text{WE}}$	Mode	$V_{\text{CC}}$ current	Dout	Ref. cycle
H	×	×	Standby	$I_{\text{SB}}, I_{\text{SB1}}$	High-Z	—
L	H	H	Output disable	$I_{\text{CC}}$	High-Z	—
L	L	H	Read	$I_{\text{CC}}$	Dout	Read cycle (1) to (3)
L	H	L	Write	$I_{\text{CC}}$	High-Z	Write cycle (1)
L	L	L	Write	$I_{\text{CC}}$	High-Z	Write cycle (2)

Note: ×: H or L

### Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply voltage relative to $V_{\text{SS}}$	$V_{\text{CC}}$	-0.5 to +4.6	V
Voltage on any pin relative to $V_{\text{SS}}$	$V_{\text{T}}$	-0.5* <sup>1</sup> to $V_{\text{CC}}+0.5$ * <sup>2</sup>	V
Power dissipation	$P_{\text{T}}$	1.0	W
Operating temperature	$T_{\text{opr}}$	0 to +70	°C
Storage temperature	$T_{\text{stg}}$	-55 to +125	°C
Storage temperature under bias	$T_{\text{bias}}$	-10 to +85	°C

- Notes: 1.  $V_{\text{T}}$  (min) = -2.0 V for pulse width (under shoot)  $\leq 8$  ns  
 2.  $V_{\text{T}}$  (max) =  $V_{\text{CC}} + 2.0$  V for pulse width (over shoot)  $\leq 8$  ns

### Recommended DC Operating Conditions ( $T_{\text{a}} = 0$ to +70°C)

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	$V_{\text{CC}}$ * <sup>3</sup>	3.0	3.3	3.6	V
	$V_{\text{SS}}$ * <sup>4</sup>	0	0	0	V
Input voltage	$V_{\text{IH}}$	2.2	—	$V_{\text{CC}} + 0.5$ * <sup>2</sup>	V
	$V_{\text{IL}}$	-0.5* <sup>1</sup>	—	0.8	V

- Notes: 1.  $V_{\text{IL}}$  (min) = -2.0 V for pulse width (under shoot)  $\leq 8$  ns  
 2.  $V_{\text{IH}}$  (max) =  $V_{\text{CC}} + 2.0$  V for pulse width (over shoot)  $\leq 8$  ns  
 3. The supply voltage with all  $V_{\text{CC}}$  pins must be on the same level.  
 4. The supply voltage with all  $V_{\text{SS}}$  pins must be on the same level.

## HM62W1400H Series

### DC Characteristics (Ta = 0 to +70°C, V<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = 0V)

Parameter	Symbol	Min	Typ* <sup>1</sup>	Max	Unit	Test conditions
Input leakage current	I <sub>I<sub>L</sub></sub>	—	—	2	μA	V <sub>in</sub> = V <sub>SS</sub> to V <sub>CC</sub>
Output leakage current	I <sub>I<sub>O</sub></sub>	—	—	2	μA	V <sub>in</sub> = V <sub>SS</sub> to V <sub>CC</sub>
Operation power supply current	12 ns cycle I <sub>CC</sub>	—	—	180	mA	Min cycle CS = V <sub>IL</sub> , I <sub>out</sub> = 0 mA Other inputs = V <sub>IH</sub> /V <sub>IL</sub>
	15 ns cycle I <sub>CC</sub>	—	—	160		
Standby power supply current	12 ns cycle I <sub>SB</sub>	—	—	60	mA	Min cycle, CS = V <sub>IH</sub> , Other inputs = V <sub>IH</sub> /V <sub>IL</sub>
	15 ns cycle I <sub>SB</sub>	—	—	50		
	I <sub>SB1</sub>	—	0.05	5	mA	
		—* <sup>2</sup>	0.05* <sup>2</sup>	1* <sup>2</sup>		
Output voltage	V <sub>OL</sub>	—	—	0.4	V	I <sub>OL</sub> = 8 mA
	V <sub>OH</sub>	2.4	—	—	V	I <sub>OH</sub> = -4 mA

Notes: 1. Typical values are at V<sub>CC</sub> = 3.3 V, Ta = +25°C and not guaranteed.  
2. This characteristics is guaranteed only for L-version.

### Capacitance (Ta = +25°C, f = 1.0 MHz)

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
Input capacitance* <sup>1</sup>	C <sub>in</sub>	—	—	6	pF	V <sub>in</sub> = 0 V
	C <sub>DIN</sub>	—	—	8	pF	V <sub>DIN</sub> = 0 V
Input/output capacitance* <sup>1</sup>	C <sub>DOUT</sub>	—	—	8	pF	V <sub>DOUT</sub> = 0 V

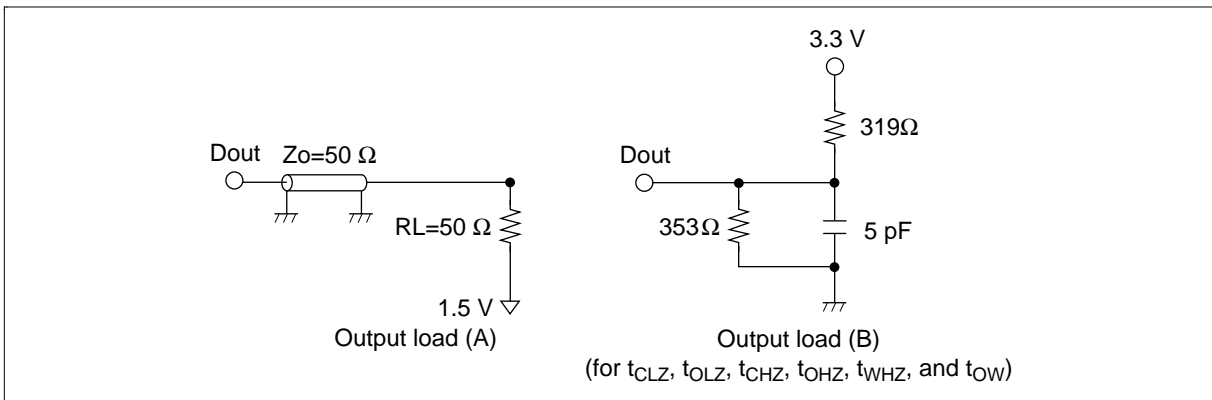
Note: 1. This parameter is sampled and not 100% tested.

## HM62W1400H Series

AC Characteristics ( $T_a = 0$  to  $+70^\circ\text{C}$ ,  $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ , unless otherwise noted.)

### Test Conditions

- Input pulse levels: 3.0 V/0.0 V
- Input rise and fall time: 3 ns
- Input and output timing reference levels: 1.5 V
- Output load: See figures (Including scope and jig)



### Read Cycle

Parameter	Symbol	HM62W1400H				Unit	Notes
		-12		-15			
		Min	Max	Min	Max		
Read cycle time	$t_{RC}$	12	—	15	—	ns	
Address access time	$t_{AA}$	—	12	—	15	ns	
Chip select access time	$t_{ACS}$	—	12	—	15	ns	
Output enable to output valid	$t_{OE}$	—	6	—	7	ns	
Output hold from address change	$t_{OH}$	3	—	3	—	ns	
Chip select to output in low-Z	$t_{CLZ}$	3	—	3	—	ns	1
Output enable to output in low-Z	$t_{OLZ}$	0	—	0	—	ns	1
Chip deselect to output in high-Z	$t_{CHZ}$	—	6	—	7	ns	1
Output disable to output in high-Z	$t_{OHZ}$	—	6	—	7	ns	1

## Write Cycle

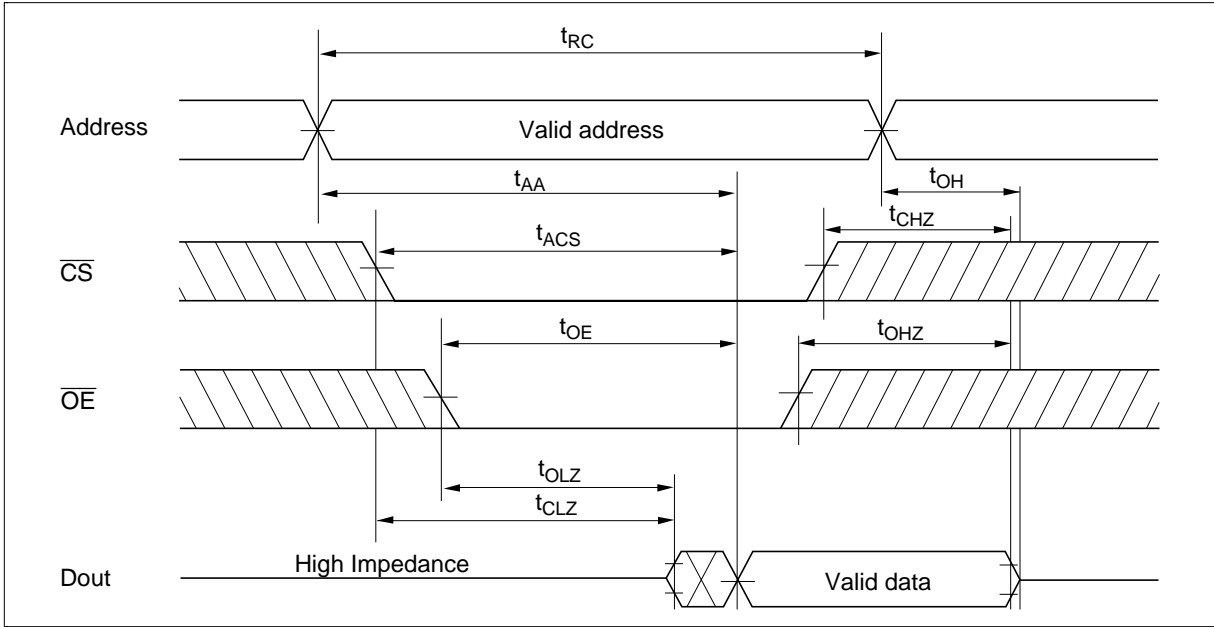
Parameter	Symbol	HM62W1400H				Unit	Notes
		-12		-15			
		Min	Max	Min	Max		
Write cycle time	$t_{WC}$	12	—	15	—	ns	
Address valid to end of write	$t_{AW}$	8	—	10	—	ns	
Chip select to end of write	$t_{CW}$	8	—	10	—	ns	9
Write pulse width	$t_{WP}$	8	—	10	—	ns	8
Address setup time	$t_{AS}$	0	—	0	—	ns	6
Write recovery time	$t_{WR}$	0	—	0	—	ns	7
Data to write time overlap	$t_{DW}$	6	—	7	—	ns	
Data hold from write time	$t_{DH}$	0	—	0	—	ns	
Write disable to output in low-Z	$t_{OW}$	3	—	3	—	ns	1
Output disable to output in high-Z	$t_{OHZ}$	—	6	—	7	ns	1
Write enable to output in high-Z	$t_{WHZ}$	—	6	—	7	ns	1

- Note:
1. Transition is measured  $\pm 200$  mV from steady voltage with Load (B). This parameter is sampled and not 100% tested.
  2. Address should be valid prior to or coincident with  $\overline{CS}$  transition low.
  3.  $\overline{WE}$  and/or  $\overline{CS}$  must be high during address transition time.
  4. If  $\overline{CS}$  and  $\overline{OE}$  are low during this period, Dout pins are in the output state. Then, the data input signals of opposite phase to the outputs must not be applied to them.
  5. If the  $\overline{CS}$  low transition occurs simultaneously with the  $\overline{WE}$  low transition or after the  $\overline{WE}$  transition, output remains a high impedance state.
  6.  $t_{AS}$  is measured from the latest address transition to the later of  $\overline{CS}$  or  $\overline{WE}$  going low.
  7.  $t_{WR}$  is measured from the earlier of  $\overline{CS}$  or  $\overline{WE}$  going high to the first address transition.
  8. A write occurs during the overlap of a low  $\overline{CS}$  and a low  $\overline{WE}$ . A write begins at the latest transition among  $\overline{CS}$  going low and  $\overline{WE}$  going low. A write ends at the earliest transition among  $\overline{CS}$  going high and  $\overline{WE}$  going high.  $t_{WP}$  is measured from the beginning of write to the end of write.
  9.  $t_{CW}$  is measured from the later of  $\overline{CS}$  going low to the the end of write.

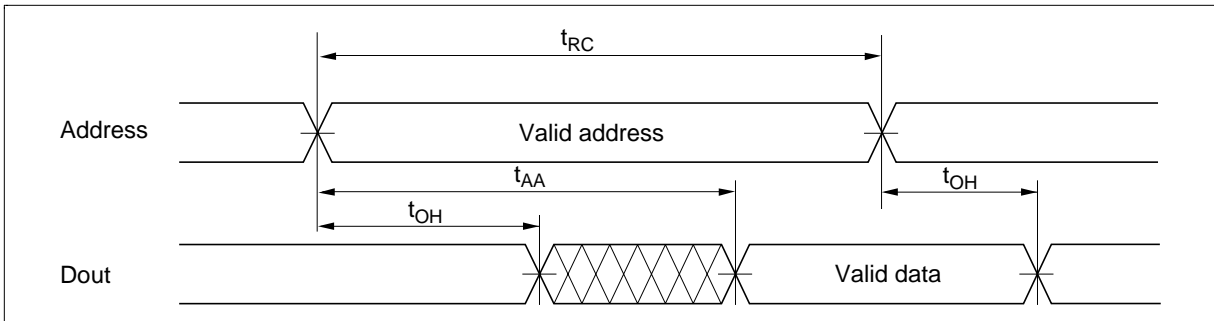
# HM62W1400H Series

## Timing Waveforms

Read Timing Waveform (1) ( $\overline{WE} = V_{IH}$ )

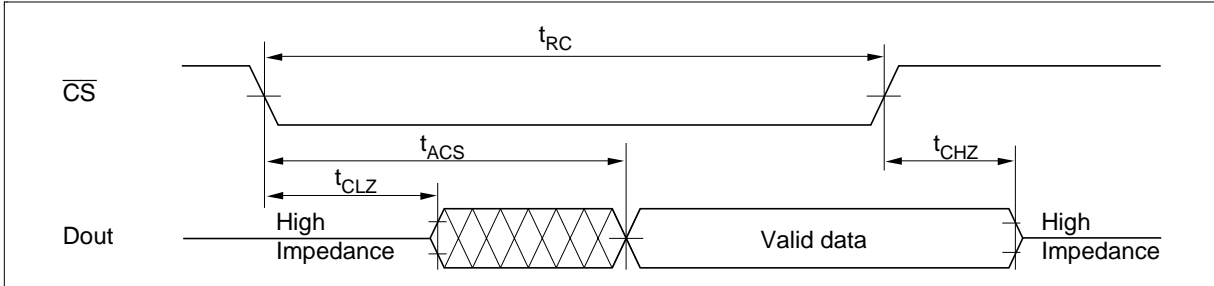


Read Timing Waveform (2) ( $\overline{WE} = V_{IH}$ ,  $\overline{CS} = V_{IL}$ ,  $\overline{OE} = V_{IL}$ )

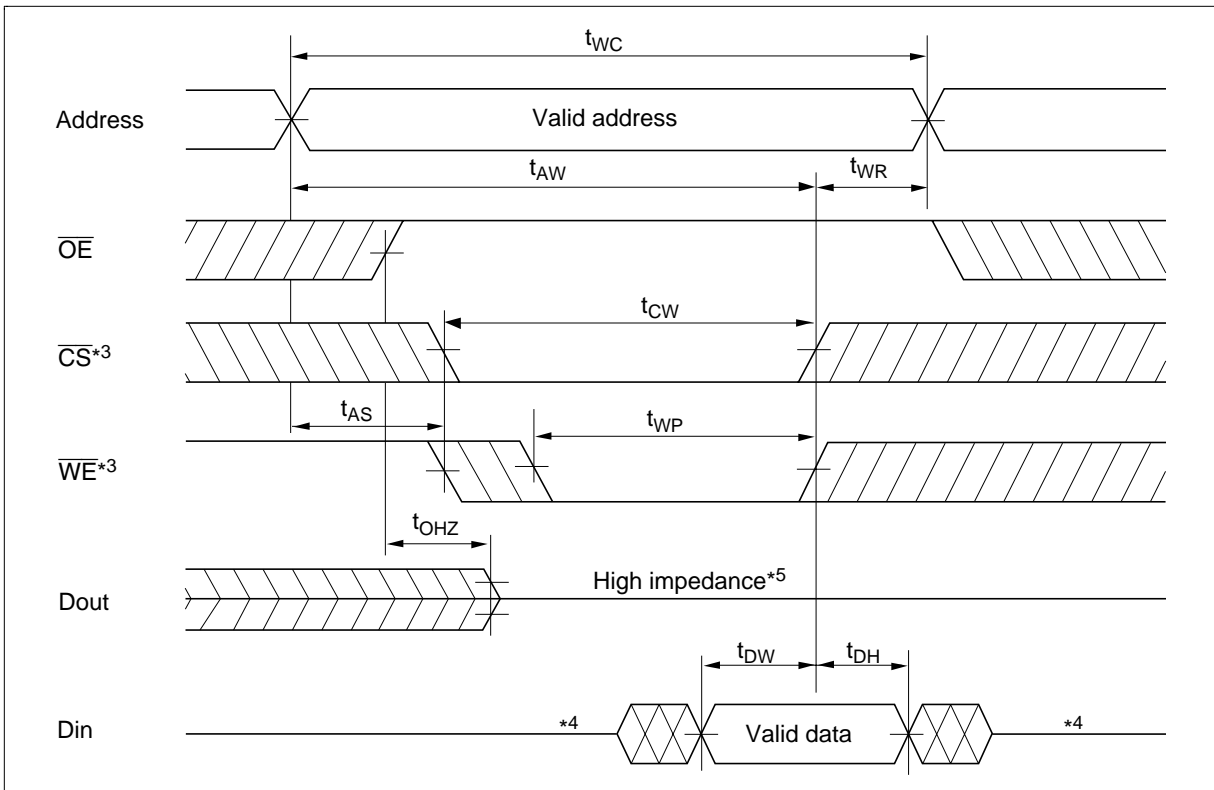




Read Timing Waveform (3) ( $\overline{WE} = V_{IH}, \overline{CS} = V_{IL}, \overline{OE} = V_{IL}$ )\*2

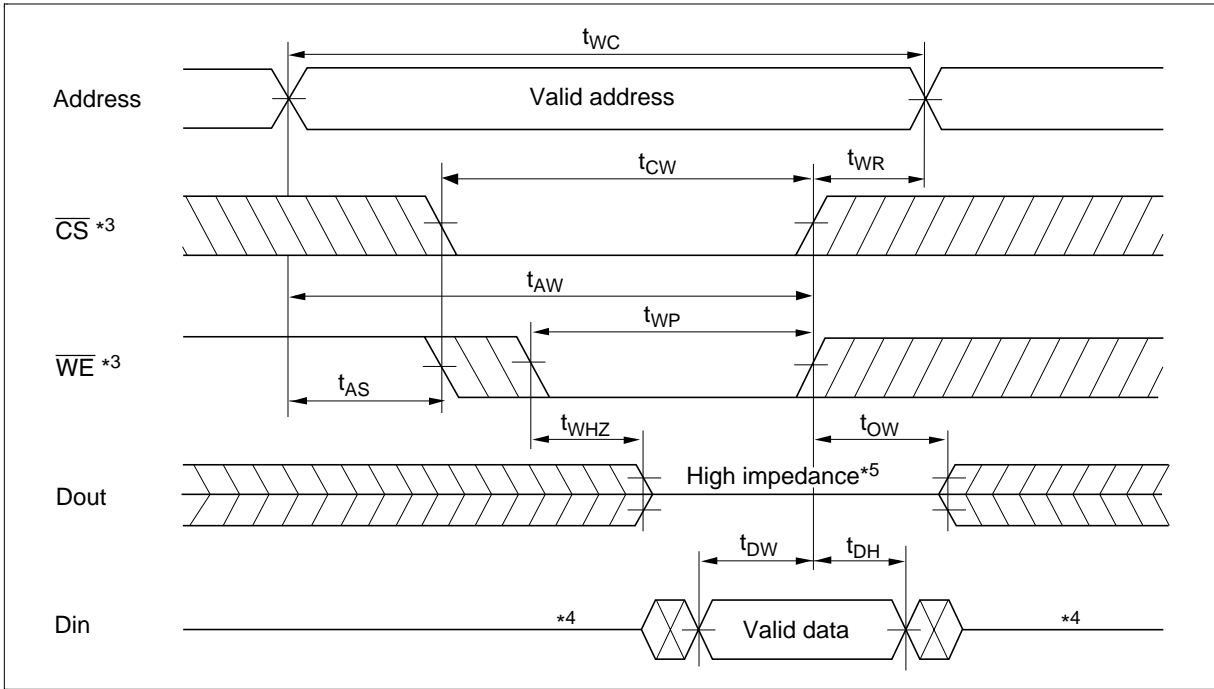


Write Timing Waveform (1) ( $\overline{WE}$  Controlled)



## HM62W1400H Series

### Write Timing Waveform (2) ( $\overline{\text{CS}}$ Controlled)



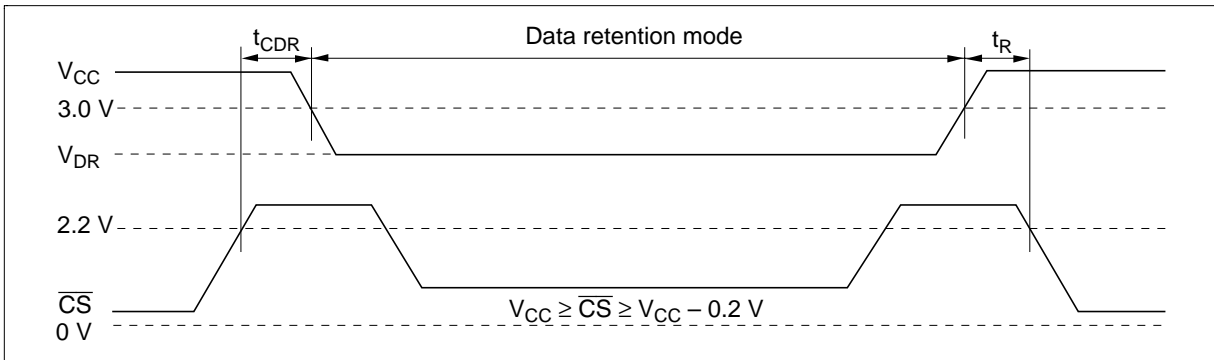
**Low  $V_{CC}$  Data Retention Characteristics** ( $T_a = 0$  to  $+70^\circ\text{C}$ )

This characteristics is guaranteed only for L-version.

Parameter	Symbol	Min	Typ*1	Max	Unit	Test conditions
$V_{CC}$ for data retention	$V_{DR}$	2.0	—	—	V	$V_{CC} \geq \overline{CS} \geq V_{CC} - 0.2$ V (1) $0 \text{ V} \leq V_{in} \leq 0.2 \text{ V}$ or (2) $V_{CC} \geq V_{in} \geq V_{CC} - 0.2 \text{ V}$
Data retention current	$I_{CCDR}$	—	40	600	$\mu\text{A}$	$V_{CC} = 3 \text{ V}$ , $V_{CC} \geq \overline{CS} \geq V_{CC} - 0.2 \text{ V}$ (1) $0 \text{ V} \leq V_{in} \leq 0.2 \text{ V}$ or (2) $V_{CC} \geq V_{in} \geq V_{CC} - 0.2 \text{ V}$
Chip deselect to data retention time	$t_{CDR}$	0	—	—	ns	See retention waveform
Operation recovery time	$t_R$	5	—	—	ms	

Note: 1. Typical values are at  $V_{CC} = 3.0 \text{ V}$ ,  $T_a = +25^\circ\text{C}$ , and not guaranteed.

**Low  $V_{CC}$  Data Retention Timing Waveform**

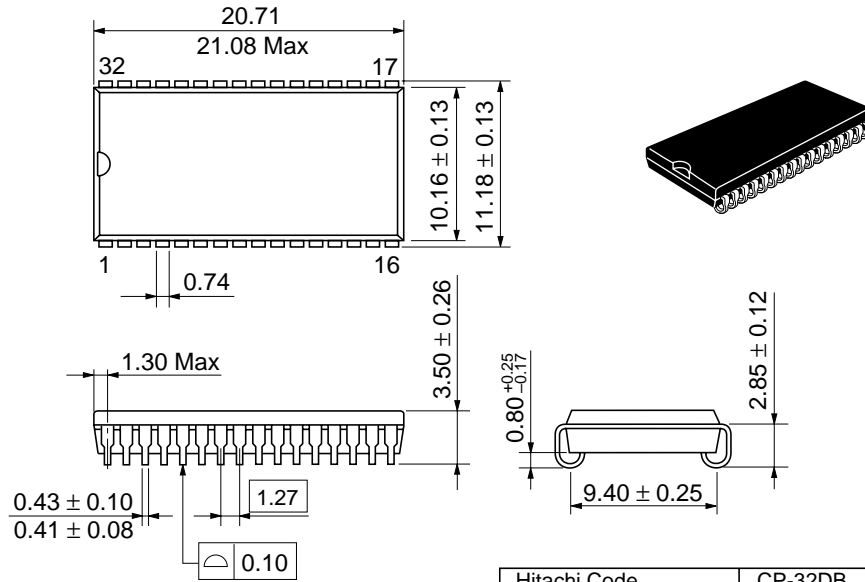


# HM62W1400H Series

## Package Dimensions

### HM62W1400HJP/HLJP Series (CP-32DB)

Unit: mm



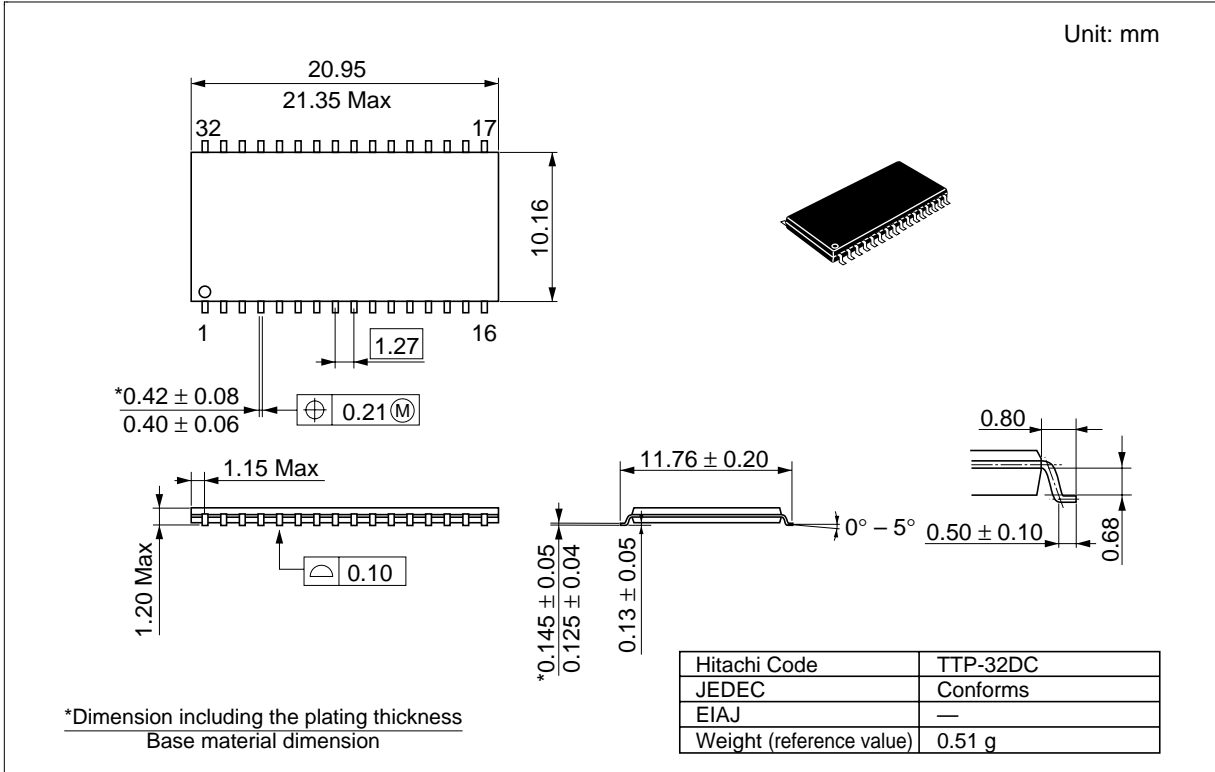
Dimension including the plating thickness  
Base material dimension

Hitachi Code	CP-32DB
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.2 g

# HM62W1400H Series

## HM62W1400HTT/HLTT Series (TTP-32DC)

Unit: mm



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## HM62W1400H Series

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### Cautions

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# HITACHI

## Hitachi, Ltd.

Semiconductor & IC Div.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      North America      : <http://semiconductor.hitachi.com/>  
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### For further information write to:

Hitachi Semiconductor  
(America) Inc.  
2000 Sierra Point Parkway  
Brisbane, CA 94005-1897  
Tel: <1> (800) 285-1601  
Fax: <1> (303) 297-0447

Hitachi Europe GmbH  
Electronic components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

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