

HM62832UH Series

32768-word × 8-bit High Speed CMOS Static RAM

HITACHI

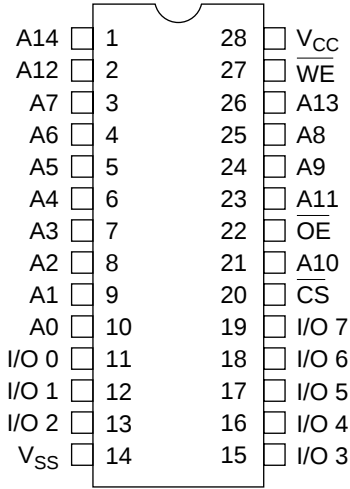
Features

- High speed: Fast access time 15/20 ns (max)
- Low Power
Standby: 15 μW (typ) (L-version)
Operation: 675/600 mW (typ)
- Single 5 V supply
- Completely static memory
No clock or timing strobe required
- Equal access and cycle times
- Common data input and output: Three state output
- Directly TTL compatible: All inputs and outputs

Ordering Information

Type No.	Access Time	Package
HM62832UHP-15	15 ns	300-mil 28-pin plastic DIP (DP-28NA)
HM62832UHP-20	20 ns	
HM62832UHLP-15	15 ns	
HM62832UHLP-20	20 ns	
HM62832UHJP-15	15 ns	300-mil 28-pin plastic SOJ (CP-28DN)
HM62832UHJP-20	20 n	
HM62832UHLJP-15	15 ns	
HM62832UHLJP-20	20 ns	

Pin Arrangement

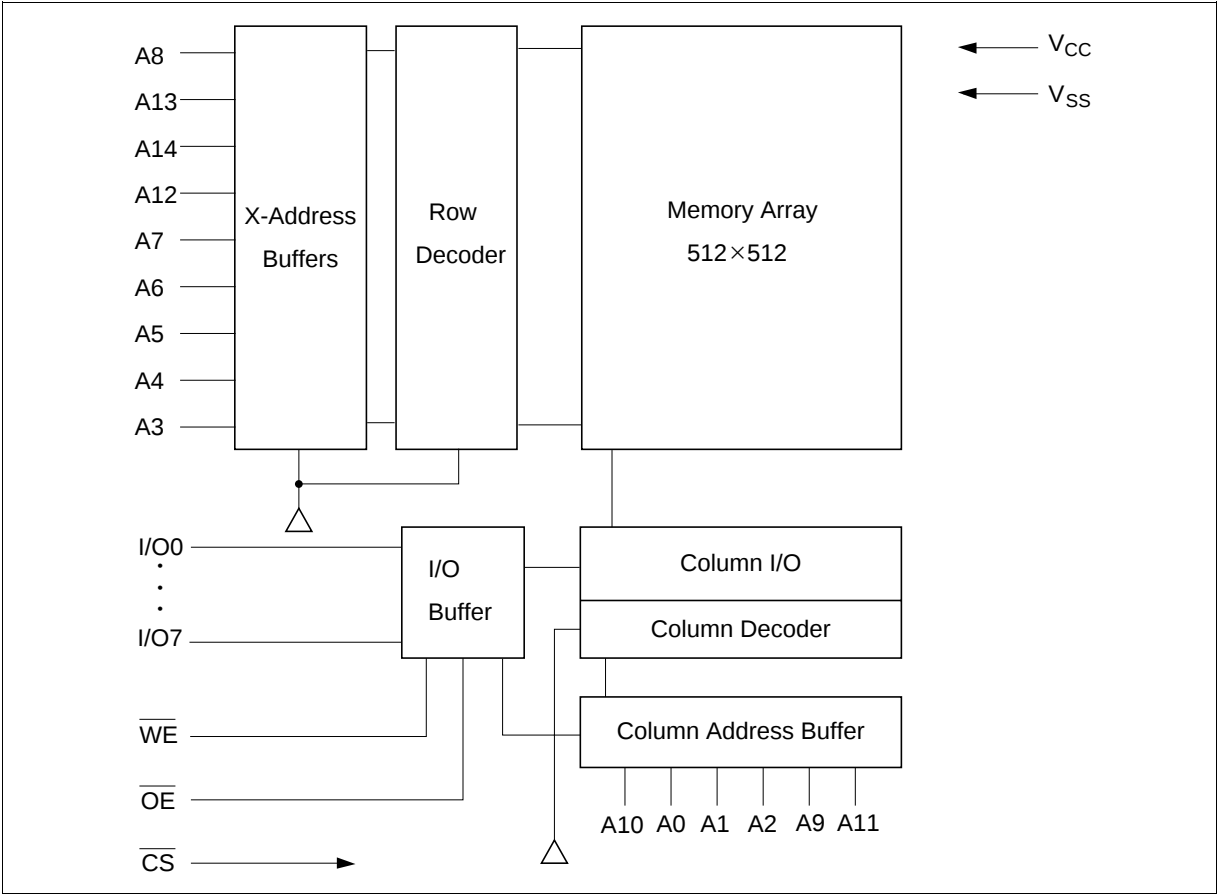


(Top view)

Pin Description

Pin name	Function
A0 – A14	Address
I/O0 – I/O7	Input/output
$\overline{CS}$	Chip select
$\overline{WE}$	Write enable
$\overline{OE}$	Output enable
V _{cc}	Power supply
V _{ss}	Ground

Block Diagram



Function Table

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	Mode	V_{CC} Current	I/O Pin	Ref. Cycle
H	X	X	Standby	I_{SB}, I_{SB1}	High-Z	
L	L	H	Read	I_{CC}	Dout	Read cycle 1, 2, 3
L	H	L	Write	I_{CC}	Din	Write cycle 1
L	L	L	Write	I_{CC}	Din	Write cycle 2

Note: X : H or L

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply voltage ^{*1}	V _{CC}	−0.5 ^{*2} to +7.0	V
Voltage on any pin relative to V _{SS} ^{*1}	V _T	−0.5 ^{*2} to V _{CC} + 0.5	V
Power dissipation	P _T	1.0	W
Operating temperature	Topr	0 to +70	°C
Storage temperature	Tstg	−55 to +125	°C
Storage temperature under bias	Tbias	−10 to +85	°C

Notes: 1. With respect to V_{SS}
2. V_{CC} and V_T min = −2.5 V for pulse width ≤ 10 ns

Recommended DC Operating Conditions (Ta = 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 high (logic 1) voltage	V _{IH}	2.2	—	V _{CC} + 0.5	V
Input low (logic 0) voltage	V _{IL}	−0.5 ^{*1}	—	0.8	V

Note: 1. V_{IL} min = −2.0 V for pulse width ≤ 10 ns

DC Characteristics (Ta = 0 to +70°C, V_{CC} = 5 V ± 10%, V_{SS} = 0 V)

Parameter	Symbol	Min	Typ ^{*1}	Max	Unit	Test Conditions
Input leakage current	I _{LI}	—	—	2.0	μA	V _{CC} = 5.5 V Vin = V _{SS} to V _{CC}
Output leakage current	I _{LO}	—	—	2.0	μA	$\overline{CS}$ = V _{IH} V _{I/O} = V _{SS} to V _{CC}
Operating V _{CC} current	I _{CC1} (-15) ^{*3}	—	135	170	mA	min cycle ^{*2}
	I _{CC2} (-15)	—	100	120	mA	2x min cycle
	I _{CC1} (-20)	—	120	150	mA	min cycle
	I _{CC2} (-20)	—	90	110	mA	2x min cycle
Standby V _{CC} current	I _{SB} (-15)	—	40	60	mA	$\overline{CS}$ = V _{IH} , min cycle
	I _{SB} (-20)	—	30	50		
Standby V _{CC} current (1)	I _{SB1} (L-version)	—	0.02	2.0	mA	$\overline{CS} \geq V_{CC} - 0.2\text{ V}$ $0\text{ V} \leq V_{in} \leq 0.2\text{ V}$ or $V_{CC} - 0.2\text{ V} \leq V_{in}$
		—	0.003	0.1		
Output low voltage	V _{OL}	—	—	0.4	V	I _{OL} = 8 mA
Output high voltage	V _{OH}	2.4	—	—	V	I _{OH} = -4.0 mA

Notes: 1. Typical values are at V_{CC} = 5.0 V, Ta = 25°C and not guaranteed.
2. $\overline{CS}$ = V_{IL}, I_{out} = 0 mA
3. Access time version

Capacitance (Ta = 25°C, f = 1.0 MHz)^{*1}

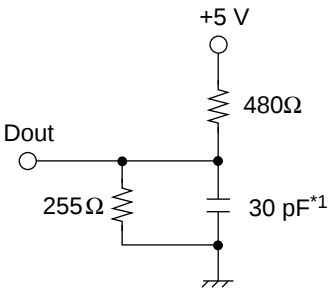
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Input capacitance	Cin	—	—	6	pF	Vin = 0 V
Output capacitance	Cout	—	—	10	pF	V _{I/O} = 0 V

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

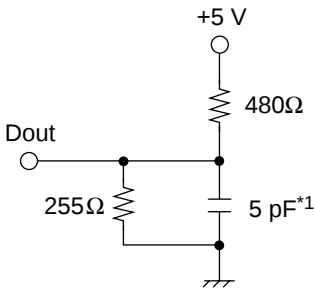
AC Characteristics (Ta = 0 to +70°C, V_{CC} = 5 V ± 10%, unless otherwise noted.)

Test Conditions

- Input pulse levels: V_{SS} to 3.0 V
- Input rise and fall time: 4 ns
- Input and Output timing reference levels: 1.5 V
- Output load: See figures



Output load (A)
Note: 1. Including scope and jig



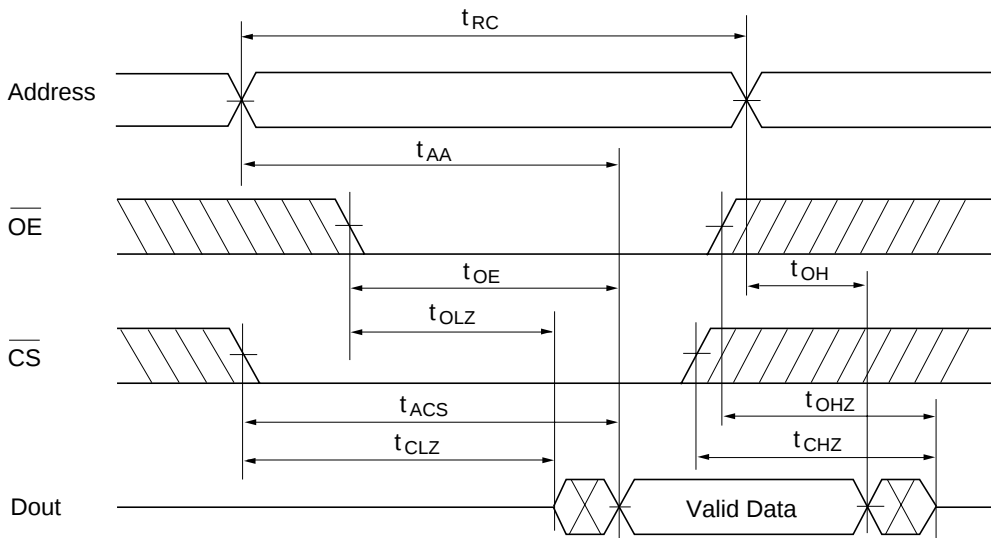
Output load (B)
(for t_{CLZ}, t_{OLZ}, t_{CHZ}, t_{OHZ}, t_{WHZ} and t_{OW})

Read Cycle

Parameter	Symbol	HM62832UH-15		HM62832UH-20		Unit
		Min	Max	Min	Max	
Read cycle time	t _{RC}	15	—	20	—	ns
Address access time	t _{AA}	—	15	—	20	ns
Chip select access time	t _{ACS}	—	15	—	20	ns
Chip selection to output in low-Z	t _{CLZ} ^{*1}	3	—	3	—	ns
Output enable to output valid	t _{OE}	—	8	—	10	ns
Output enable to output in low-Z	t _{OLZ} ^{*1}	0	—	0	—	ns
Chip deselection to output in high-Z	t _{CHZ} ^{*1}	0	7	0	10	ns
Chip disable to output in high-Z	t _{OHZ} ^{*1}	0	7	0	10	ns
Output hold from address change	t _{OH}	3	—	3	—	ns

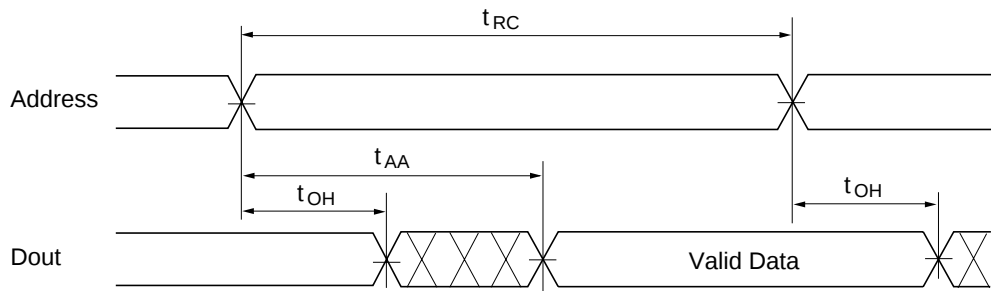
Note: 1. Transition is measured ±200 mV from steady state voltage with Load (B). This parameter is sampled and not 100% tested.

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



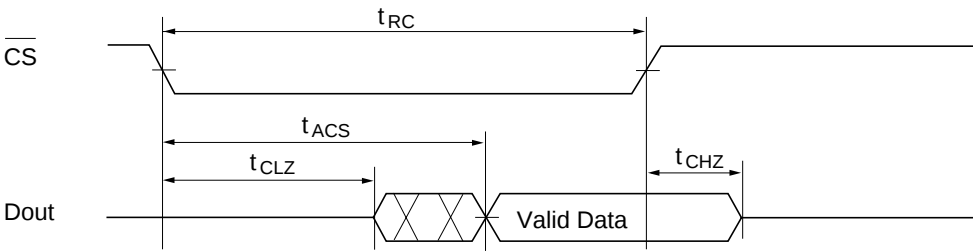
Note: 1. Transition is measured ± 200 mV from steady state voltage with Load (B). This parameter is sampled and not 100% tested.

Read Timing Waveform (2)*1 ($\overline{WE} = V_{IH}, \overline{CS} = V_{IL}, \overline{OE} = V_{IL}$)



Note: 1. Transition is measured ± 200 mV from steady state voltage with Load (B). This parameter is sampled and not 100% tested.

Read Timing Waveform (3) ^{*1, *2} ($\overline{WE} = V_{IH}, \overline{OE} = V_{IL}$)



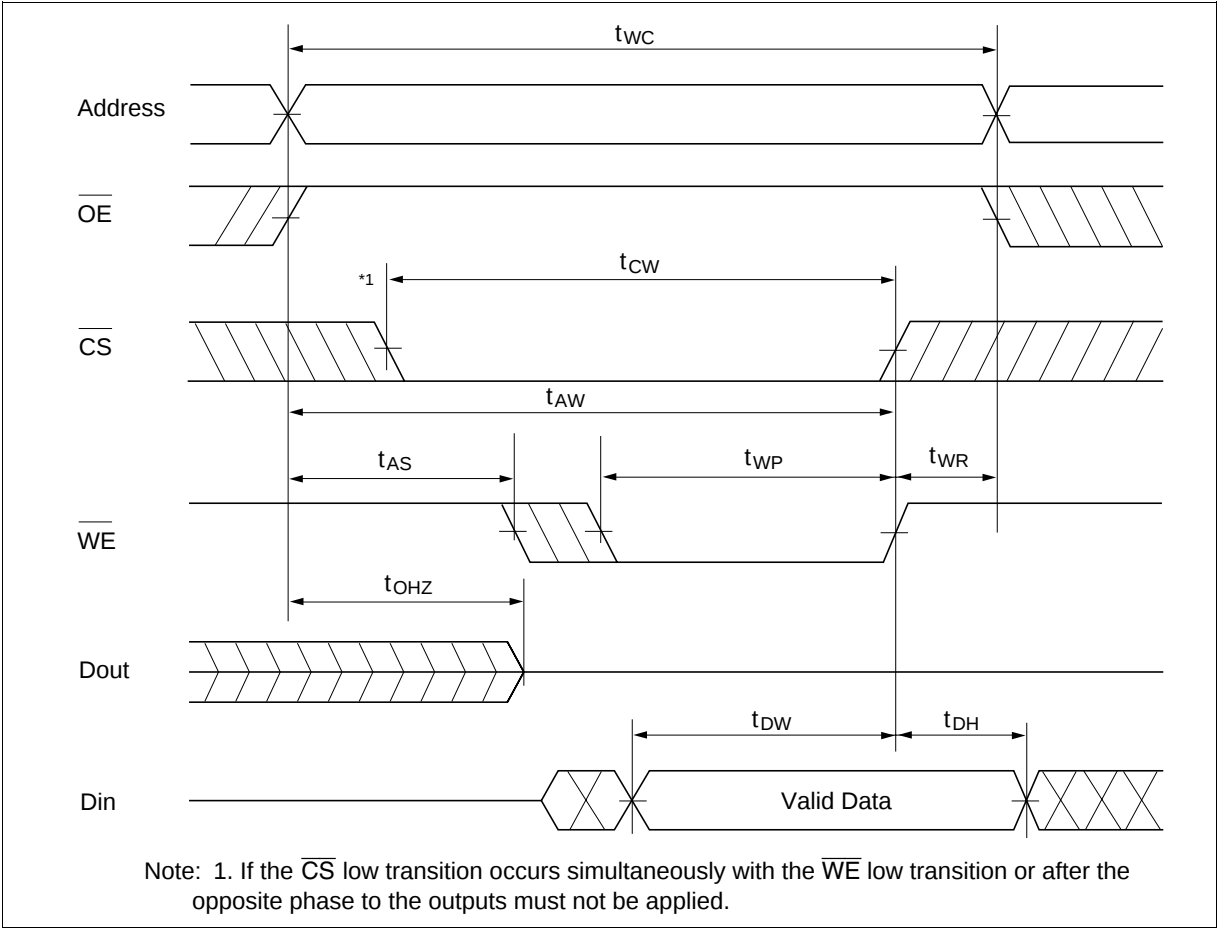
Notes: 1. Transition is measured ± 200 mV from steady state voltage with Load (B). This parameter is sampled and not 100% tested.
2. Address valid prior to or coincident with $\overline{CS}$ transition low.

Write Cycle

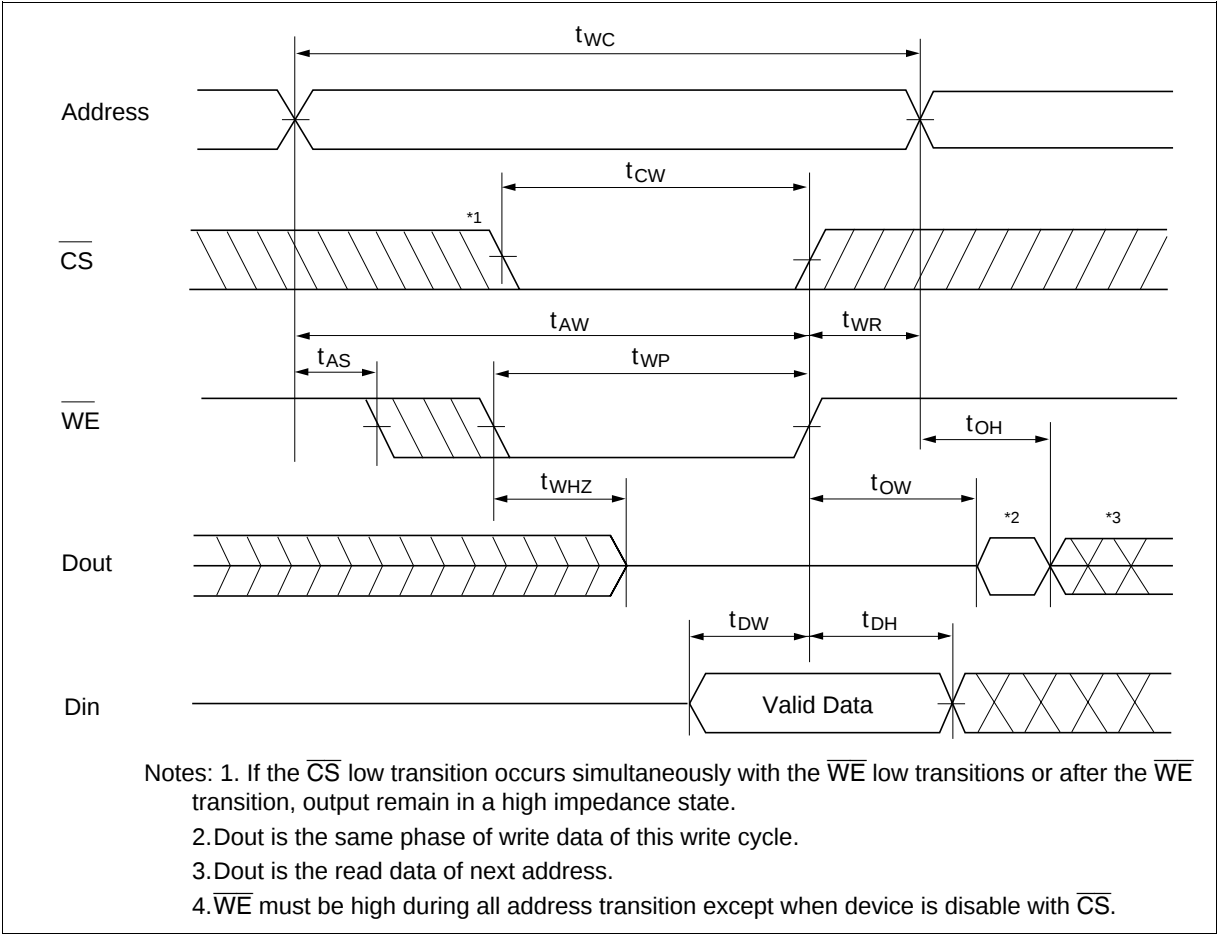
Parameter	Symbol	HM62832UH-15		HM62832UH-20		Unit
		Min	Max	Min	Max	
Write cycle time	t_{WC}	15	—	20	—	ns
Chip selection to end of write	t_{CW}	10	—	12	—	ns
Address valid to end of write	t_{AW}	13	—	15	—	ns
Address setup time	t_{AS}	0	—	0	—	ns
Write pulse width ^{*2}	t_{WP}	10	—	12	—	ns
Write recovery time ^{*3}	t_{WR}	0	—	0	—	ns
Output disable to output in high-Z ^{*1, 4}	t_{OHZ}	0	7	0	10	ns
Write to output in high-Z ^{*1, 4}	t_{WHZ}	0	7	0	10	ns
Data to write time overlap	t_{DW}	8	—	10	—	ns
Data hold from write time ^{*6}	t_{DH}	0	—	0	—	ns
Output active from end of write ^{*1, 6}	t_{OW}	3	—	3	—	ns
Output hold from address change ^{*5}	t_{OH}	3	—	3	—	ns

Notes: 1. Transition is measured ± 200 mV from high impedance voltage with Load (B). This parameter is sampled and not 100% tested.
2. A write occurs during the overlap (t_{WP}) to a low $\overline{CS}$ and a low $\overline{WE}$.
3. t_{WR} is measured from the earliest of $\overline{CS}$ or $\overline{WE}$ going high to the end of write cycle.
4. During this period, I/O pins are in the output state so that the input signals of the opposite phase to the outputs must not be applied.
5. D_{out} is the same phase of write data of this write cycle.
6. If $\overline{CS}$ is low during this period, I/O pins are in the output state. Then the data input signals of opposite phase to the outputs must not be applied to them.

Write Timing Waveform (1)



Write Timing Waveform (2) ($\overline{\text{OE}}$ low Fixed)^{*4}



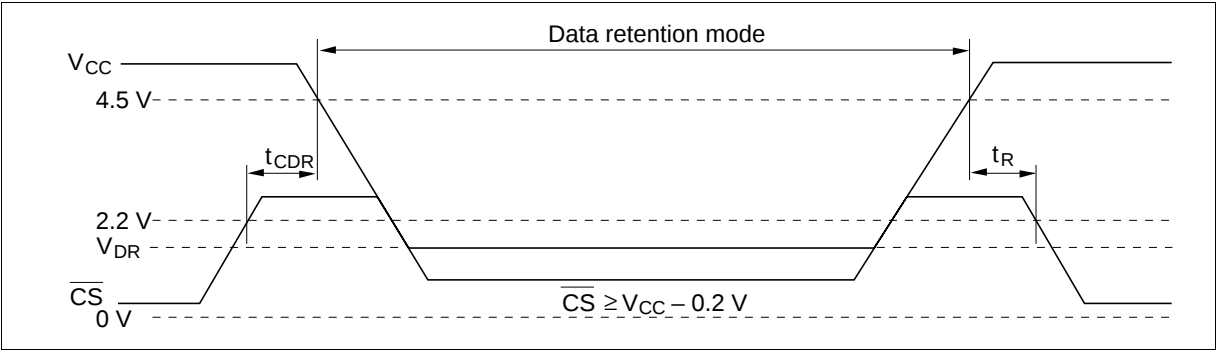
Low V_{CC} Data Retention Characteristics (Ta = 0 to +70°C)

This characteristics is guaranteed only for L-version.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
V _{CC} for data retention	V _{DR}	2	—	—	V	$\overline{CS} \geq V_{CC} - 0.2V$, $V_{in} \geq V_{CC} - 0.2V$ or $0V < V_{in} \leq 0.2V$
Data retention current	I _{CCDR}	—	2	50 ¹⁾	μA	
Chip deselect to data retention time	t _{CDR}	0	—	—	ns	
Operation recovery time	t _R	5	—	—	ms	

Note: 1. V_{CC} = 3.0 V

Low V_{CC} Data Retention Timing Waveform

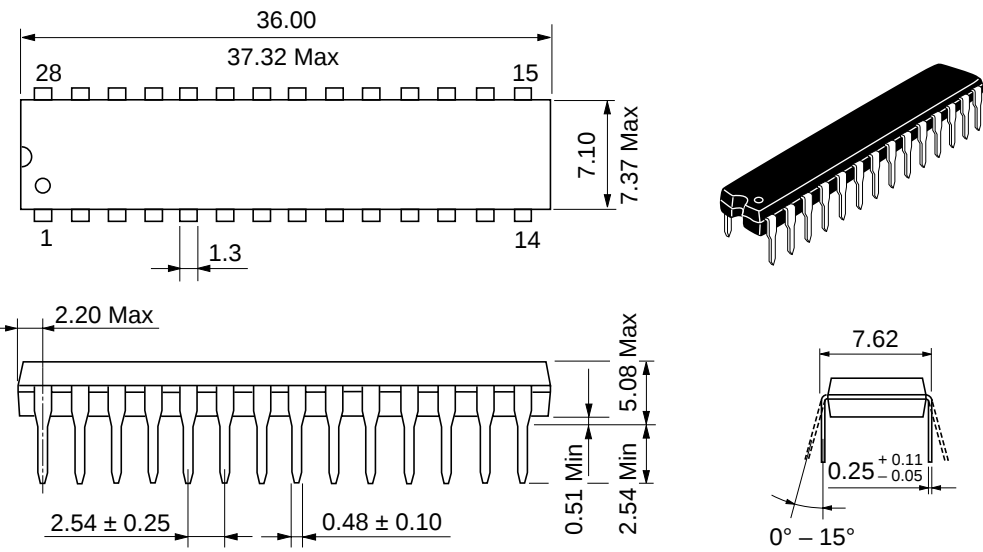


HM62832UH Series

Package Dimensions

HM62832UHP/UHLP Series (DP-28NA)

Unit: mm



HM62832UHJP/UHLJP Series (CP-28DN)

Unit: mm

