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# HM6207H Series

262,144-word × 1-bit High Speed CMOS Static RAM

# HITACHI

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## Features

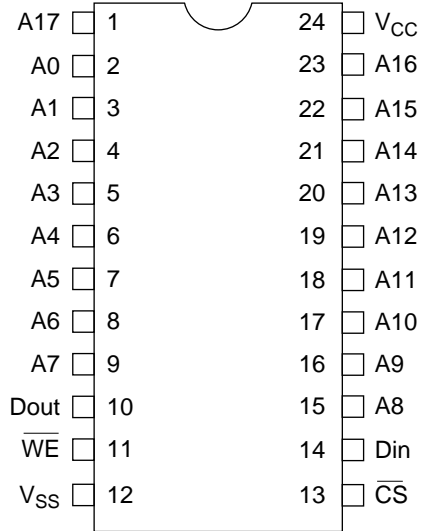
- Single 5 V supply and high density 24-pin package
- High speed  
Access time: 25/35/45 ns (max)
- Low power
  - Operation: 300 mW (typ)
  - Standby: 100  $\mu$ W (typ)  
30  $\mu$ W (typ) (L-version)
- Completely static memory required, no clock or timing strobe required
- Equal access and cycle time
- Directly TTL compatible, all inputs and outputs
- Battery backup operation capability (L-version)

## Ordering Information

Type No.	Access Time	Package
HM6207HP-25	25 ns	300-mil 24-pin plastic DIP (DP-24NC)
HM6207HP-35	35 ns	
HM6207HP-45	45 ns	
HM6207HLP-25	25 ns	
HM6207HLP-35	35 ns	
HM6207HLP-45	45 ns	
HM6207HJP-25	25 ns	300-mil 24-pin SOJ (CP-24D)
HM6207HJP-35	35 ns	
HM6207HJP-45	45 ns	
HM6207HLJP-25	25 ns	
HM6207HLJP-35	35 ns	
HM6207HLJP-45	45 ns	

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## Pin Arrangement

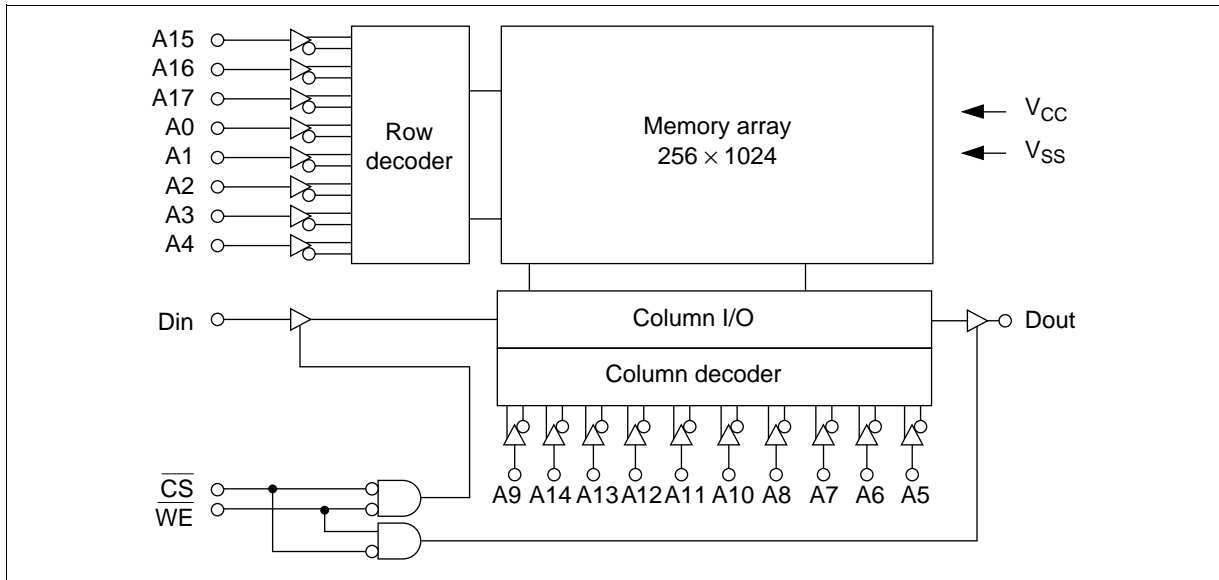


(Top view)

## Pin Description

Pin Name	Function
A0–A17	Address
Din	Data input
Dout	Data output
$\overline{CS}$	Chip select
$\overline{WE}$	Write enable
V <sub>CC</sub>	Power supply
V <sub>SS</sub>	Ground

Block Diagram



Function Table

$\overline{CS}$	$\overline{WE}$	Mode	$V_{CC}$ Current	I/O Pin	Ref. Cycle
H	×	Not selected	$I_{SB}, I_{SB1}$	High-Z	—
L	H	Read	$I_{CC}$	Dout	Read cycle
L	L	Write	$I_{CC}$	High-Z	Write cycle

Note: × = Don't care.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Voltage on any pin relative to $V_{SS}$	$V_{in}$	-0.5 <sup>1</sup> to +7.0	V
Power dissipation	$P_T$	1.0	W
Operating temperature range	$T_{opr}$	0 to +70	°C
Storage temperature range	$T_{stg}$	-55 to +125	°C
Storage temperature range under bias	$T_{bias}$	-10 to +85	°C

Note: 1.  $V_{in\ min} = -2.5\ V$  for pulse width < 10 ns.

# HM6207H Series

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

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V <sub>CC</sub>	4.5	5.0	5.5	V
	V <sub>SS</sub>	0	0	0	V
Input high (logic 1) voltage	V <sub>IH</sub>	2.2	—	6.0	V
Input low (logic 0) voltage	V <sub>IL</sub>	-0.5 <sup>*1</sup>	—	0.8	V

Note: 1. V<sub>IL</sub> min = -2.0 V for pulse width ≤ 10 ns.

## DC Characteristics (Ta = 0 to +70°C, V<sub>CC</sub> = 5 V ±10%, V<sub>SS</sub> = 0 V)

Parameter	Symbol	HM6207H-25		HM6207H-35/45			Unit	Test Conditions
		Min	Typ <sup>*1</sup>	Min	Typ <sup>*1</sup>	Max		
Input leakage current	I <sub>LI</sub>	—	—	2.0	—	—	2.0	μA V <sub>CC</sub> = Max, Vin = V <sub>SS</sub> to V <sub>CC</sub>
Output leakage current	I <sub>LO</sub>	—	—	10.0	—	—	10.0	μA $\overline{CS} = V_{IH}$ , V <sub>I/O</sub> = V <sub>SS</sub> to V <sub>CC</sub>
Operating power supply current	I <sub>CC</sub>	—	60	120	—	50	100	mA $\overline{CS} = V_{IL}$ , I <sub>I/O</sub> = 0 mA, min cycle, duty = 100%
	I <sub>CC1</sub>	—	40	80	—	40	80	mA $\overline{CS} = V_{IL}$ , I <sub>I/O</sub> = 0 mA, t cycle = 50 ns, duty = 100%
Standby power supply current	I <sub>SB</sub>	—	20	40	—	15	30	mA $\overline{CS} = V_{IH}$ , min cycle
Standby power supply current (1)	I <sub>SB1</sub>	—	0.02	2.0	—	0.02	2.0	mA $\overline{CS} \geq V_{CC} - 0.2$ V, 0 V ≤ Vin < 0.2, or Vin ≥ V <sub>CC</sub> - 0.2 V
	L- Version	—	0.006	0.1	—	0.006	0.1	
Output low voltage	V <sub>OL</sub>	—	—	0.4	—	—	0.4	V I <sub>OL</sub> = 8 mA
Output high voltage	V <sub>OH</sub>	2.4	—	—	2.4	—	—	V I <sub>OH</sub> = -4.0 mA

Note: 1. Typical values are at V<sub>CC</sub> = 5.0 V, Ta = +25°C and not guaranteed.

## Capacitance (Ta = 25°C, f = 1 MHz)<sup>\*1</sup>

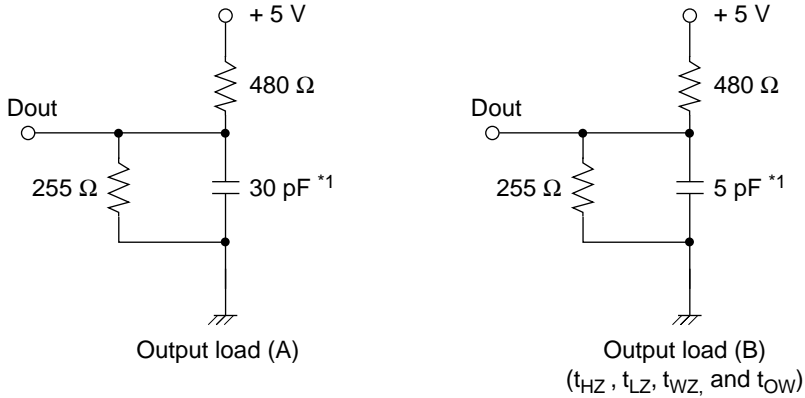
Parameter	Symbol	Min	Max	Unit	Test Conditions
Input capacitance	Cin	—	6	pF	Vin = 0 V
Output capacitance	Cout	—	10	pF	Vout = 0 V

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

**AC Characteristics** ( $T_a = 0$  to  $+70^\circ\text{C}$ ,  $V_{CC} = 5\text{ V} \pm 10\%$  unless otherwise noted)

**Test Conditions**

- Input pulse levels:  $V_{SS}$  to 3.0 V
- Input and output timing reference levels: 1.5 V
- Input rise and fall time: 5 ns
- Output load: See figures



Note: 1. Including scope and jig

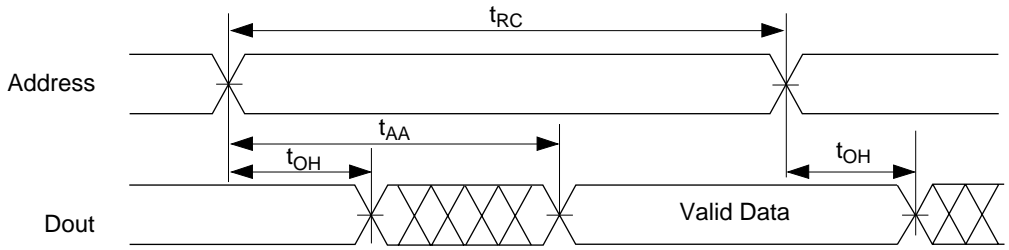
**Read Cycle**

Parameter	Symbol	HM6207H-25		HM6207H-35		HM6207H-45		Unit
		Min	Max	Min	Max	Min	Max	
Read cycle time	$t_{RC}$	25	—	35	—	45	—	ns
Address access time	$t_{AA}$	—	25	—	35	—	45	ns
Chip select access time	$t_{ACS}$	—	25	—	35	—	45	ns
Output hold from address change	$t_{OH}$	5	—	5	—	5	—	ns
Chip selection to output in low-Z	$t_{LZ}^{*1}$	5	—	5	—	5	—	ns
Chip deselection to output in high-Z	$t_{HZ}^{*1}$	0	15	0	20	0	20	ns

Note: 1. Transition is measured  $\pm 200$  mV from steady-state voltage with Load (B).

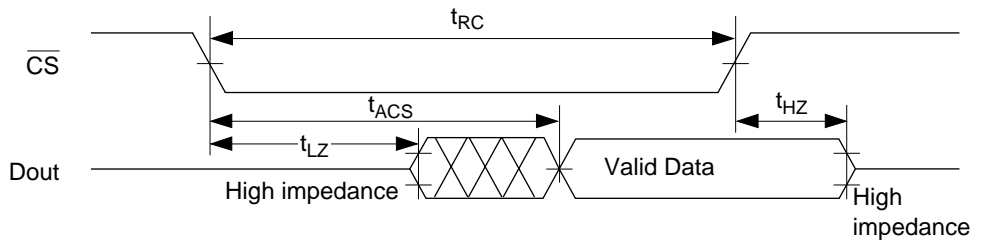
These parameters are sampled and not 100% tested.

## Read Timing Waveform (1)



- Notes: 1.  $\overline{WE}$  is high for read cycle.  
2. Device is continuously selected,  $\overline{CS} = V_{IL}$ .

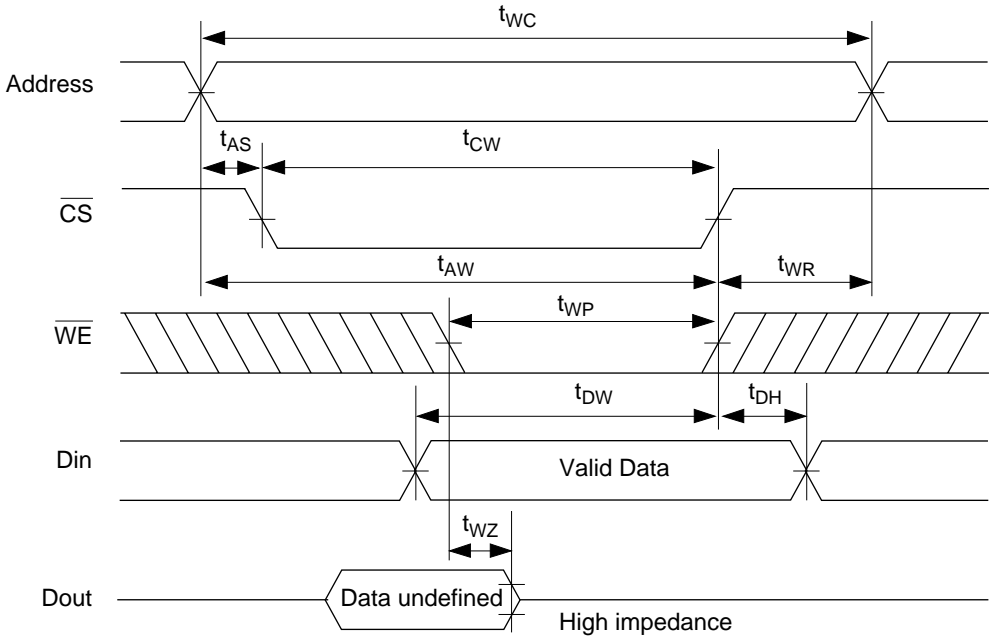
## Read Timing Waveform (2)



- Notes: 1.  $\overline{WE}$  is high for read cycle.  
2. Address valid prior to coincident with  $\overline{CS}$  transition low.



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



- Notes:
1. A write occurs during the overlap of a low  $\overline{CS}$  and a low  $\overline{WE}$ .
  2.  $t_{WR}$  is measured from the earlier of  $\overline{CS}$  or  $\overline{WE}$  going high to the end of the write cycle.
  3. If the  $\overline{CS}$  low transition occurs simultaneously with the  $\overline{WE}$  low transition, the output buffers remain in a high impedance state.
  4.  $D_{out}$  has the same phase as write data in this write cycle, if  $t_{WR}$  is long enough.



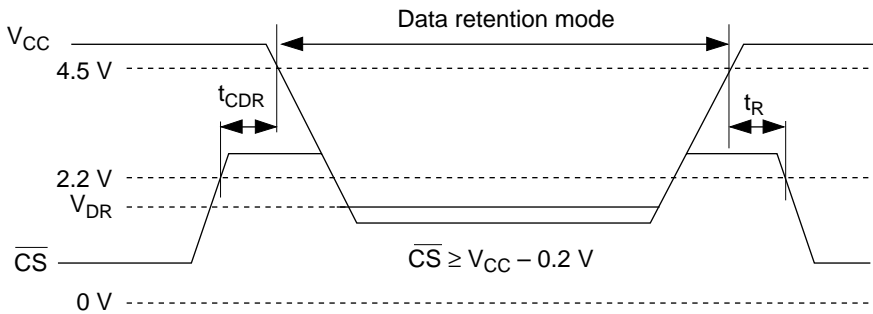
**Low  $V_{CC}$  Data Retention Characteristics** ( $T_a = 0$  to  $+70^\circ\text{C}$ )

These characteristics are guaranteed for the L-version only.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
$V_{CC}$ for data retention	$V_{DR}$	2.0	—	—	V	$\overline{CS} \geq V_{CC} - 0.2\text{ V}$ , $V_{in} \geq V_{CC} - 0.2\text{ V}$ , or $0\text{ V} \leq V_{in} \leq 0.2\text{ V}$
Data retention current	$I_{CCDR}$	—	2	$50^{-1}$	$\mu\text{A}$	
Chip deselect to data retention time	$t_{CDR}$	0	—	—	ns	
Operation recovery time	$t_R$	5	—	—	ms	

Note: 1.  $V_{CC} = 3.0\text{ V}$

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

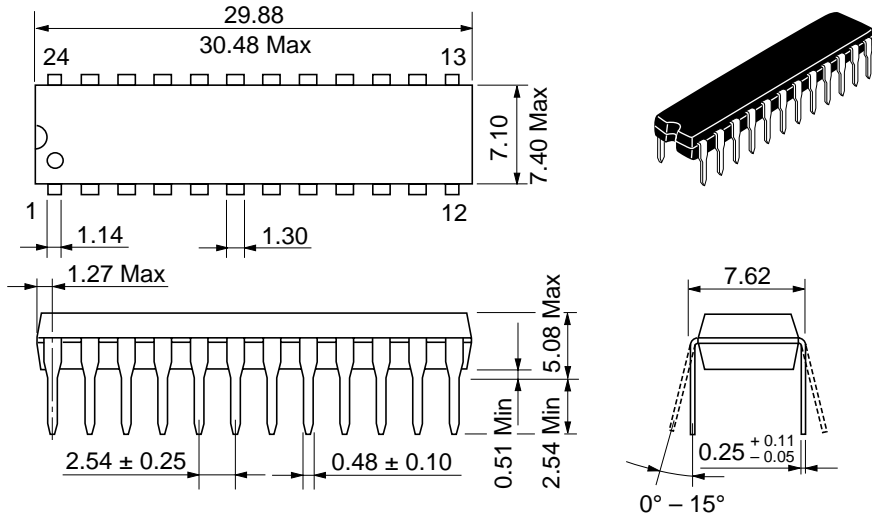


# HM6207H Series

## Package Dimensions

HM6207HP/HLP Series (DP-24NC)

Unit: mm



HM6207HJP/HLJP Series (CP-24D)

Unit: mm

