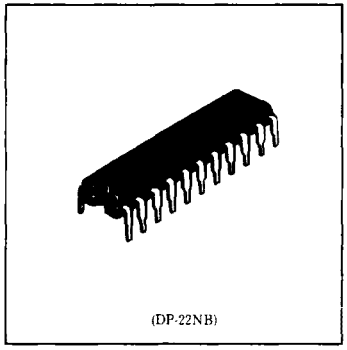
HM6788 Series — Maintenance Only

16384-word x 4-bit High Speed Hi-BiCMOS Static RAM

Refer to HM6788HA Series

■FEATURES

- Super Fast Access Time : 25/30ns (max.)
- Low power Operation
  Operating: 230mW (typ), Standby: 10mW (typ)
- +5V Single Supply
- Completely Static Memory –
  No Clock or Timing Strobe required
- Balanced Read and Write Cycle Time
- Fully TTL compatible Input and Output

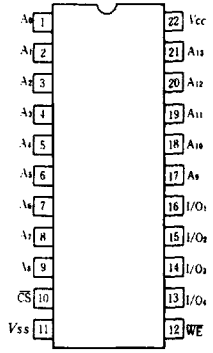


(DP-22NB)

■ ORDERING INFORMATION

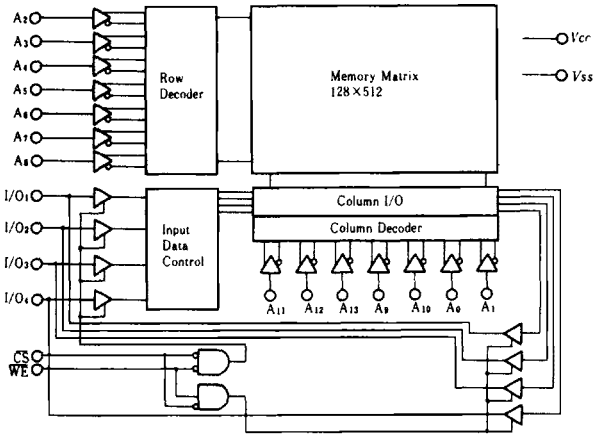
Type No.	Access Time	Package
HM6788P-25	25ns	300 mil 22 pin Plastic DIP
HM6788P-30	30ns	

■PIN ARRANGEMENT



(Top View)

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Terminal Voltage to Vss pin	V_T	−0.5 to +7.0	V
Power Dissipation	P_T	1.0	W
Operating Temperature	T_{opr}	0 to +70	°C
Storage Temperature (with bias)	T_{stg}(bias)	−10 to +85	°C
Storage Temperature	T_{stg}	−55 to +125	°C

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■TRUTH TABLE

$\overline{CS}$	$\overline{WE}$	Mode	V_{CC} Current	Output Pin	Ref. Cycle
H	×	Not selected	I_{SB}, I_{SB1}	High Z	–
L	H	Read	I_{CC}, I_{CC1}	Dout	Read Cycle (1) (2)
L	L	Write	I_{CC}, I_{CC1}	Din	Write Cycle (1) (2)

×: H or L

■RECOMMENDED DC OPERATING CONDITIONS ($0°C \leqq Ta \leqq 70°C$)

Item	Symbol	min	typ	max	Unit
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
	V_{SS}	0	0	0	V
Input High Voltage	V_{IH}	2.2	–	6.0	V
Input Low Voltage	V_{IL}	−0.5*1	–	0.8	V

Note) *1. −3.0V with 20ns pulse width

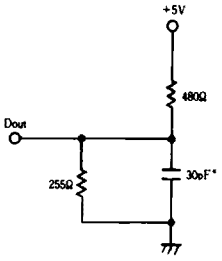
■DC AND OPERATING CHARACTERISTICS ($V_{CC}=5V \pm 10\%$, $Ta=0°C$ to $+70°C$)

Item	Symbol	Test Conditions	min	typ	max	Unit
Input Leakage Current	$\lvert I_{LI} \rvert$	$V_{CC}=5.5V$, $V_{IN}=V_{SS}$ to V_{CC}	–	–	2	μA
Output Leakage Current	$\lvert I_{LO} \rvert$	$\overline{CS}=V_{IH}$, $V_{I/O}=V_{SS}$ to V_{CC}	–	–	2	μA
Opearating Power Supply Current	I_{CC}	$\overline{CS}=V_{IL}$, $I_{I/O}=0mA$	–	–	80	mA
Average Operating Current	I_{CC1}	Min. Cycle, Duty: 100%	–	–	120	mA
Standby Power Supply Current	I_{SB}	$\overline{CS}=V_{IH}$	–	–	30	mA
	I_{SB1}	$\overline{CS} \geqq V_{CC}-0.2V$, $V_{IN} \leqq 0.2V$ or $V_{IN} \geqq V_{CC}-0.2V$	–	–	10	mA
Output Low Voltage	V_{OL}	$I_{OL}=8mA$	–	–	0.5	V
Output High Voltage	V_{OH}	$I_{OH}=-4mA$	2.4	–	–	V

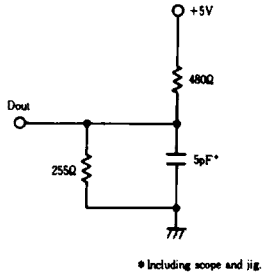
■AC CHARACTERISTICS (V_{CC} = 5V ±10%, T_a = 0 to +70°C, unless otherwise noted)

- **AC Test Conditions**

Input pulse levels: V_{SS} to 3.0V
Input rise and fall time: 4ns
Input and Output reference levels: 1.5V
Output Load: See Figure



Output Load A



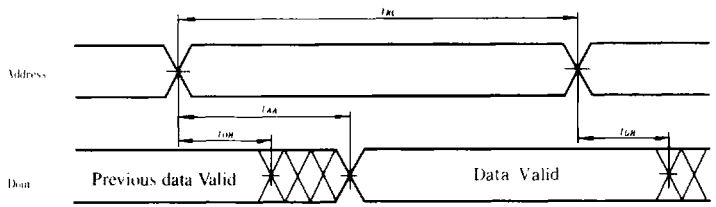
Output Load B
(t_{CHZ}, t_{WHZ}, t_{CLZ}, t_{OW})

● READ CYCLE

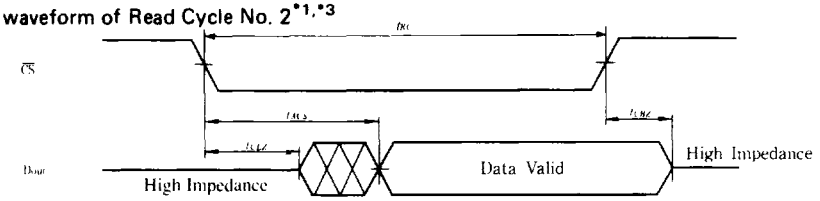
Item	Symbol	HM6788-25		HM6788-30		Unit
		min	max	min	max	
Read Cycle Time	t_{RC}	25		30		ns
Address Access Time	t_{AA}		25		30	ns
Chip Select Access Time	t_{ACS}		25		30	ns
Chip Selection to Output in Low Z	t_{CLZ} *2	0		0		ns
Chip Deselection to Output in High Z	t_{CHZ} *2	0	10	0	12	ns
Output Hold from Address Change	t_{OH}	5		5		ns
Chip Selection to Power Up Time*1	t_{PU}	0		0		ns
Chip Deselection to Power Down Time*1	t_{PD}		20		30	ns
Input Voltage Rise Fall Time*3	t_f		150		150	ns

Notes) *1. This parameter is sampled and not 100% tested.
*2. Transition is measured ±200mV form steady state voltage with Load (B). This parameter is sampled and not 100% tested
*3. If t_f becomes more than 150ns, there is possibility of function fail
please contact your nearest Hitachi Sales Dept regarding specification

● Timing waveform of Read Cycle No. 1 *1,*2



● Timing waveform of Read Cycle No. 2 *1,*3



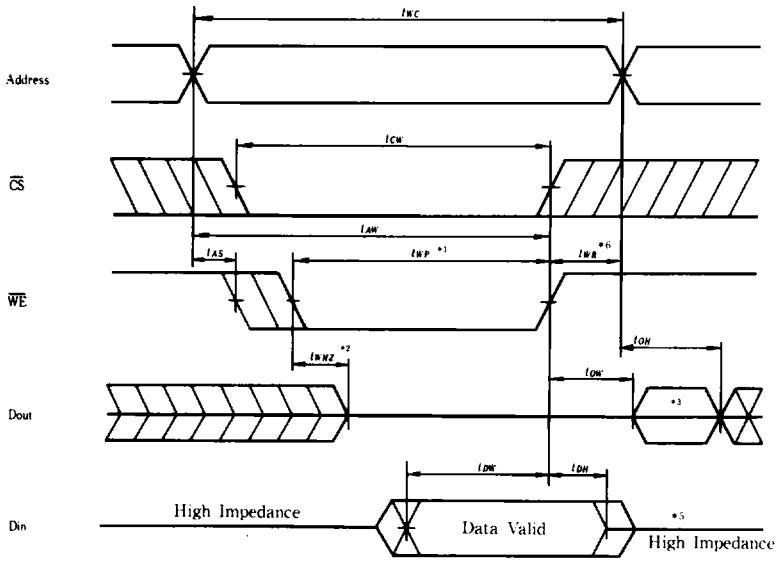
Note) *1. $\overline{WE} = V_{IH}$
*2. $\overline{CS} = V_{IL}$
*3. Address valid prior to or coincident with $\overline{CS}$ transition Low.

● WRITE CYCLE

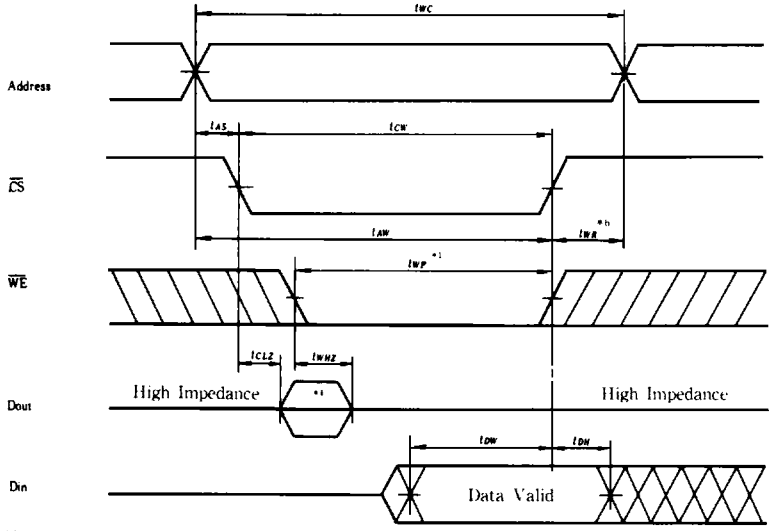
Item	Symbol	HM6788-25		HM6788-30		Unit
		min	max	min	max	
Write Cycle Time	t_{WC}	25		30		ns
Chip Selection to End of Write	t_{CW}	20		25		ns
Address Setup Time	t_{AS}	0		0		ns
Address Valid to End of Write	t_{AW}	20		25		ns
Write Pulse Width	t_{WP}	20		25		ns
Write Recovery Time	t_{WR}	0		0		ns
Write to Output in High Z	t_{WHZ} *1	0	10	0	12	ns
Data Valid to End of Write	t_{DW}	15		15		ns
Data Hold Time	t_{DH}	5		5		ns
Output Active from End of Write	t_{OW} *1	0		0		ns

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

- Timing waveform of Write Cycle No. 1 ($\overline{WE}$ Controlled)



- Timing waveform of Write Cycle No. 2 ($\overline{CS}$ Controlled)



Notes) *1. A write occurs during the overlap (t_{WP}) of a low $\overline{CS}$ and a low $\overline{WE}$.
*2. During this period, I/O pins are in the output state so that the input signals of opposite phase to the outputs must not be applied.
*3. Dout is the same phase of write data of this write cycle.
*4. If the $\overline{CS}$ low transition occurs after the $\overline{WE}$ low transition, output remain in a high impedance state.
*5. 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.
*6. t_{WR} is measured from the earlier of $\overline{CS}$ or $\overline{WE}$ going high to the end of write cycle.

■CAPACITANCE (Ta=25°C, f=1.0MHz)

Item	Symbol	min	typ	max	Conditions
Input Capacitance	C_{IN}	–	–	6.0	V_{IN}=0V
Input/Output Capacitance	$C_{I/O}$	–	–	8.0	V_{OUT}=0V

Note) This parameter is sampled and not 100% tested.