HM6268 Series

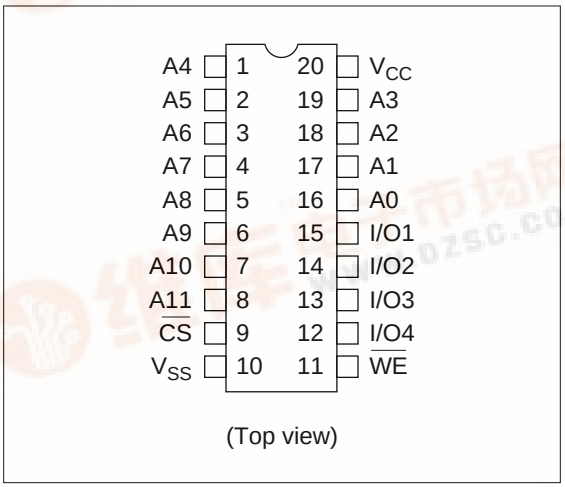
Maintenance only

4096-word × 4-bit High-Speed CMOS Static RAM

Features

- Single 5 V supply and high density 20-pin package
- High speed: fast access time 25/35/45 ns (max)
- Low power
  - — Active: 250 mW (typ)
  - — Standby: 100 µW (typ), 5 µW (typ) (L-version)
- Completely static memory: no clock or timing strobe required
- Equal access and cycle times
- Directly TTL compatible—all inputs and outputs
- Battery back-up operation capability (L-version)

Pin Arrangement



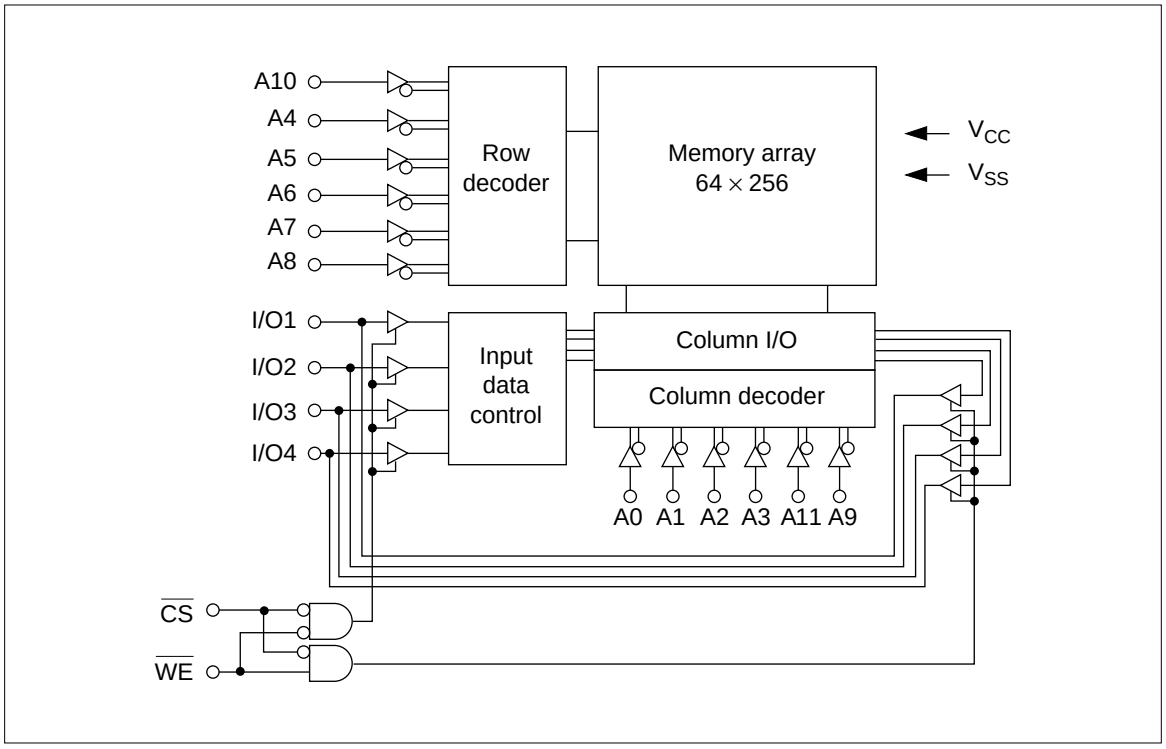
(Top view)

Ordering Information

Type No.	Access time	Package
HM6268P-25	25 ns	300-mil 20-pin, plastic DIP (DP-20N)
HM6268P-35	35 ns	
HM6268P-45	45 ns	
HM6268LP-25	25 ns	
HM6268LP-35	35 ns	
HM6268LP-45	45 ns	

Note: This device is not available for new application.

Block Diagram



Truth Table

$\overline{CS}$	$\overline{WE}$	Mode	V_{CC} current	I/O pin	Cycle
H	x	Not Selected	I_{SB}, I_{SB1}	High-Z	—
L	H	Read	I_{CC}	Dout	Read cycle
L	L	Write	I_{CC}	Din	Write cycle

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Voltage on any pin relative to V_{SS}	V_T	–0.5 [*1] to +7.0	V
Power dissipation	P_T	1.0	W
Operating temperature	Topr	0 to + 70	°C
Storage temperature	Tstg	–55 to +125	°C
Temperature under bias	Tbias	–10 to + 85	°C

Note: 1. –3.5 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	—	6.0	V
Input low (logic 0) voltage	V_{IL}	–0.5 *1	—	0.8	V

Note: 1. –3.0 V for pulse width ≤ 10 ns.

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

Parameter	Symbol	Min	Typ *1	Max	Unit	Test condition
Input leakage current	$\lvert I_{LI} \rvert$	—	—	2.0	µA	V_{CC} = 5.5 V, Vin = V_{SS} to V_{CC}
Output leakage current	$\lvert I_{LO} \rvert$	—	—	2.0	µA	$\overline{CS}$ = V_{IH}, $V_{I/O}$ = V_{SS} to V_{CC}
Operating power supply current	I_{CC}	—	50 *3	90	mA	$\overline{CS}$ = V_{IL}, $I_{I/O}$ = 0 mA, min. cycle
Standby power supply current	I_{SB}	—	15	25	mA	$\overline{CS}$ = V_{IH}, min. cycle
Standby power supply current (1)	I_{SB1}	—	0.02	2.0	mA	$\overline{CS}$ ≥ V_{CC} – 0.2 V, 0 V ≤ V_{IN} ≤ 0.2 V or V_{CC} – 0.2 V ≤ V_{IN}
		—	1 *2	50 *2	µA	
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 limits are at V_{CC} = 5.0 V, Ta = +25°C and specified loading
2. This characteristic is guaranteed only for L-version.
3. 40 mA typical for 45 ns version.

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

Parameter	Symbol	Test conditions	Min	Max	Unit
Input capacitance	Cin	Vin = 0 V	—	6	pF
Input/output capacitance	$C_{I/O}$	$V_{I/O}$ = 0 V	—	9	pF

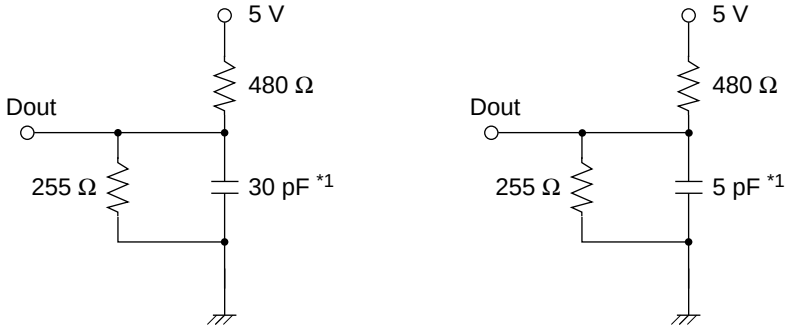
Note: 1. These parameters are sampled and not 100% tested.

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

AC Test Conditions:

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

Output Load



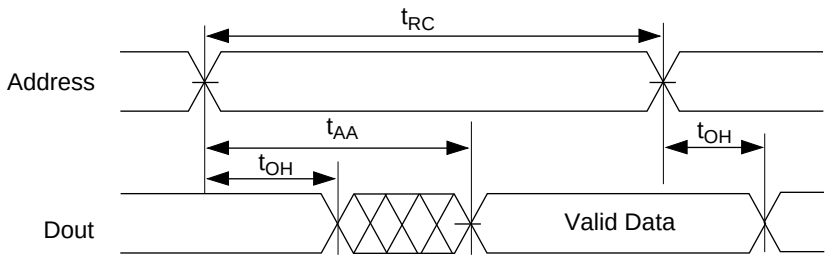
Note: 1. Including scope and jig

Read Cycle

		HM6268-25		HM6268-35		HM6268-45		
Parameter	**Symbol**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Unit**
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	10	—	10	—	10	—	ns
Chip deselection to output in high-Z	t_{HZ} *1	0	15	0	20	0	20	ns
Chip selection to power up time	t_{PU}	0	—	0	—	0	—	ns
Chip deselection to power down time	t_{PD}	—	25	—	25	—	30	ns

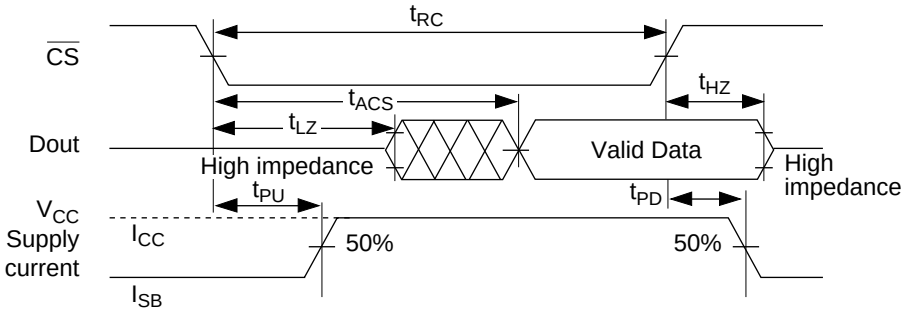
Note: 1. Transition is measured +200 mV from steady state voltage with load (B). These parameters are sampled and not 100% tested.

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)



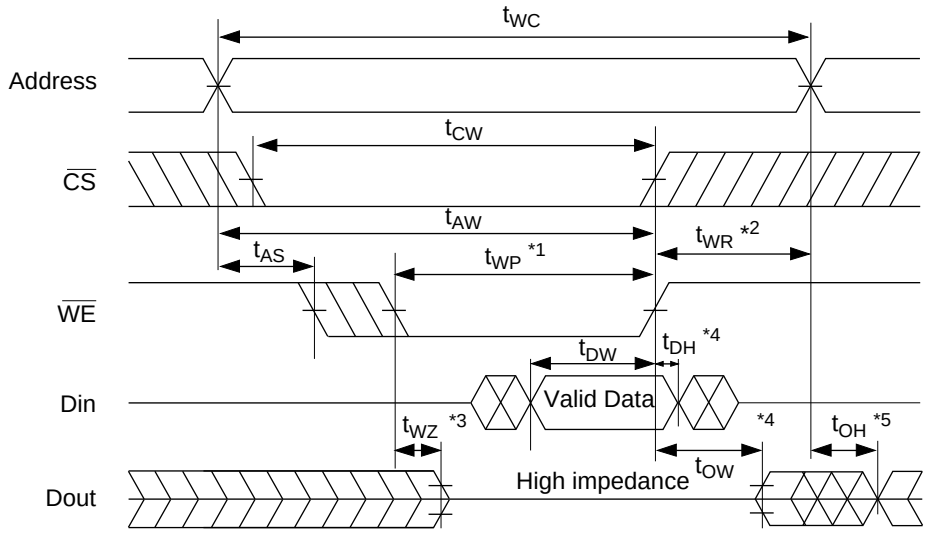
Notes: 1. $\overline{WE}$ is high for read cycle.
2. Address valid prior to or coincident with $\overline{CS}$ transistion low.

Write Cycle

		HM6268-25		HM6268-35		HM6268-45		
Parameter	**Symbol**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Unit**
Write cycle time	t_{WC}	25	—	35	—	45	—	ns
Chip selection to end of write	t_{CW}	20	—	30	—	40	—	ns
Address valid to end of write	t_{AW}	20	—	30	—	40	—	ns
Address setup time	t_{AS}	0	—	0	—	0	—	ns
Write pulse width	t_{WP}	20	—	30	—	35	—	ns
Write recovery time	t_{WR}	0	—	0	—	0	—	ns
Data valid to end of write	t_{DW}	12	—	20	—	20	—	ns
Data hold time	t_{DH}	0	—	0	—	0	—	ns
Write enabled to output in high-Z	t_{WZ} *1	0	8	0	10	0	15	ns
Output active from end of write	t_{OW} *1	0	—	0	—	0	—	ns

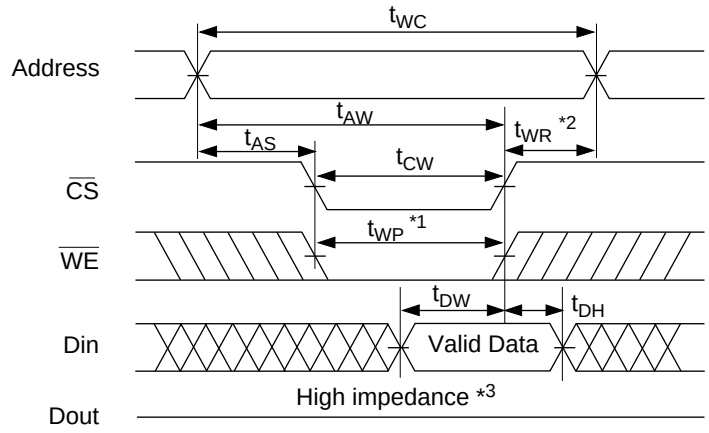
Note: 1. Transition is measured +200 mV from steady state voltage with load (B).
These parameters are sampled and not 100% tested.

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



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

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



Notes: 1. A write cycle occurs during the overlap of a low $\overline{CS}$ and a low $\overline{WE}$ (t_{WP}).
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 or after the $\overline{WE}$ transition, the output buffers remain in a high impedance state.

Low V_{CC} Data Retention Characteristics (0°C ≤ Ta ≤ 70°C)

These characteristics are guaranteed only for L-version.

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
V_{CC} for data retention	V_{DR}	2.0	—	—	V	$\overline{CS} \geq V_{CC} - 0.2$ V, $V_{IN} \geq V_{CC} - 0.2$ V, or $0 V \leq V_{IN} \leq 0.2$ V
Data retention current	I_{CCDR}	—	—	30 *2 20 *3	µA	
Chip deselect to data retention time	t_{CDR}	2.0	—	—	ns	See retention waveform
Operation recovery time	t_R	t_{RC} *1	—	—	ns	

Notes: 1. Read cycle time
2. V_{CC} = 3.0 V
3. V_{CC} = 2.0 V

Low V_{CC} Data Retention Waveform