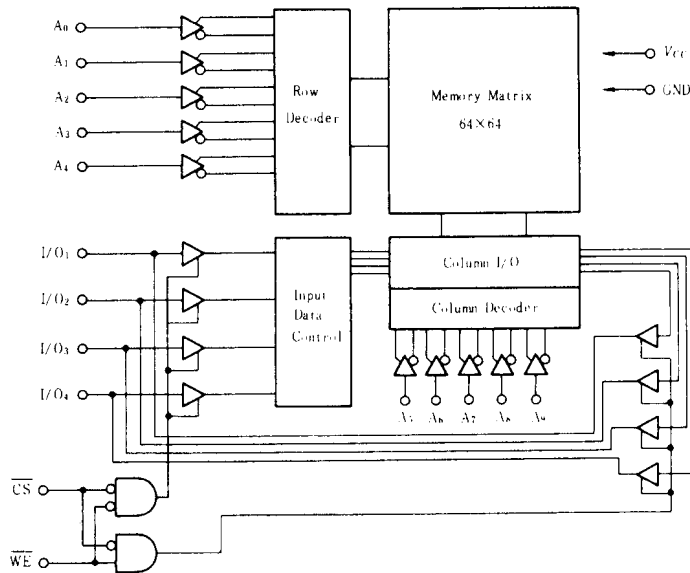


# HM472114-3, HM472114-4, HM472114P-3, HM472114P-4

## 1024-word × 4-bit Static Random Access Memory

- Fast Access Time ..... HM472114-3 300ns (max.)  
HM472114-4 450ns (max.)
- Low Operating Power ..... 200mW (typ)
- Single +5V Supply Voltage
- Completely Static Memory ..... No Clock or Refresh Required
- Directly TTL Compatible ..... All Inputs and Outputs
- Common Data Inputs and Output
- Three-state Outputs
- DC Standby Mode ..... Reduces  $V_{CC}$
- N-channel Si Gate MOS Technology
- Interchangeable with Intel 2114L Series

### ■ BLOCK DIAGRAM

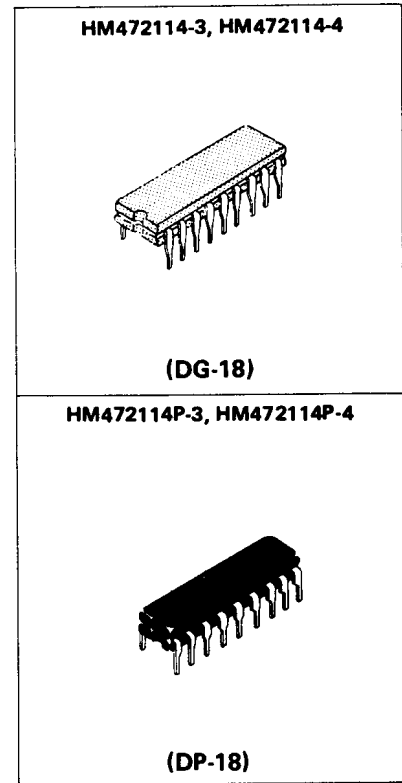


### ■ ABSOLUTE MAXIMUM RATINGS

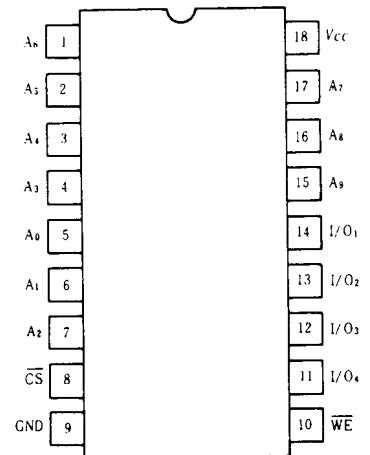
Item	Symbol	Value	Unit
Terminal Voltage	$V_T$	-0.3 to +7	V
Power Dissipation	$P_T$	1.0	W
Operating Temperature	$T_{opr}$	0 to +70	°C
Storage Temperature (Ceramic)	$T_{stg}$	-65 to +150	°C
Storage Temperature (Plastic)	$T_{stg}$	-55 to +125	°C

### ■ RECOMMENDED DC OPERATING CONDITIONS

Item	Symbol	min.	typ.	max.	Unit
Supply Voltage	$V_{CC}$	4.5	5.0	5.5	V
Input Voltage	$V_{IL}$	-0.3	—	0.8	V
	$V_{IH}$	2.0	—	$V_{CC} + 1.0$	V
Operating Temperature	$T_{opr}$	0	—	70	°C



### ■ PIN ARRANGEMENT



(Top View)

■ DC AND OPERATING ELECTRICAL CHARACTERISTICS ( $V_{CC}=5V \pm 10\%$ ,  $T_a=0 \sim +70^\circ C$ )

Item	Symbol	Test Condition	min.	typ.	max.	Unit
Input Leakage Current	$I_{LI}$	$V_{in}=0 \sim 5.5V$	—	—	10	$\mu A$
I/O Leakage Current	$ I_{LO} $	$\overline{CS}=2.0V$ , $V_{I/O}=0.4 \sim V_{CC}$	—	—	10	$\mu A$
Supply Current	$I_{CC}$	$V_{in}=5.5V$ , $I_{I/O}=0mA$	—	35	60	mA
Input Voltage	$V_{IL}$		-0.5	—	0.8	V
	$V_{IH}$		2.0	—	$V_{CC}+1.0$	V
Output Voltage	$V_{OL}$	$I_{OL}=2.1mA$	—	—	0.4	V
	$V_{OH}$	$I_{OH}=-0.6mA$ , $V_{CC}=4.5V$	2.4	—	—	V
		$I_{OH}=-1.0mA$ , $V_{CC}=4.75V$	2.4	—	—	

■ CAPACITANCE ( $T_a=25^\circ C$ ,  $f=1MHz$ )

Item	Symbol	Test Condition	min.	typ.	max.	Unit
Input Capacitance	$C_{in}$	$V_{in}=0V$	—	3	5	pF
I/O Capacitance	$C_{I/O}$	$V_{I/O}=0V$	—	5	10	pF

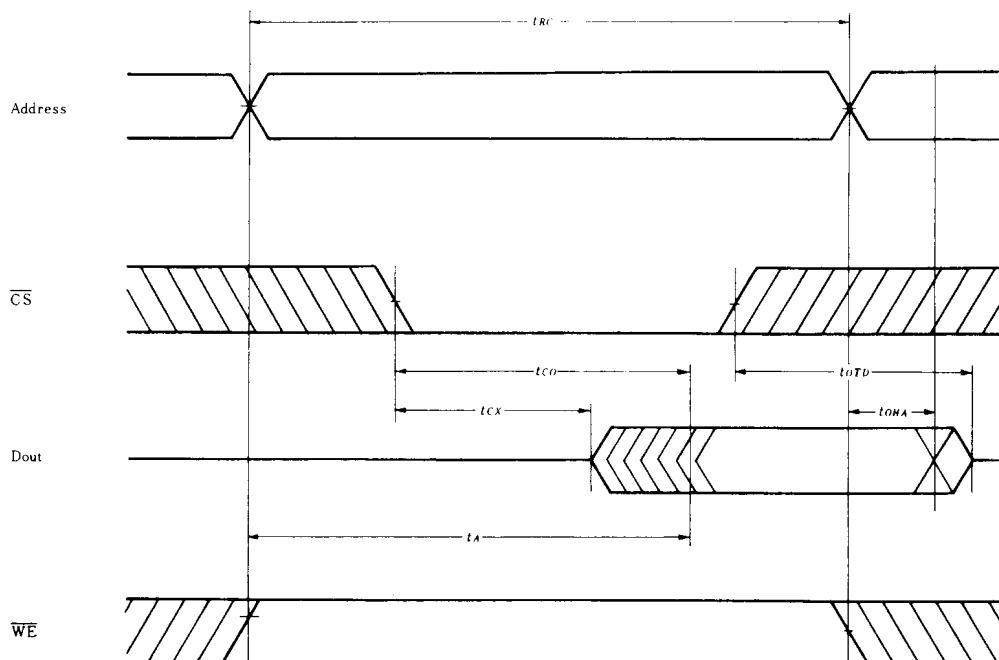
■ AC ELECTRICAL CHARACTERISTICS ( $V_{CC}=5V \pm 10\%$ ,  $T_a=0$  to  $+70^\circ C$ )

● AC TEST CONDITIONS

Input High Levels	2.0V
Input Low Levels	0.8V
Input Rise and Fall Times	10ns
Input and Output Timing Levels	1.5V
Output Load	1 TTL + $C_L=100pF$

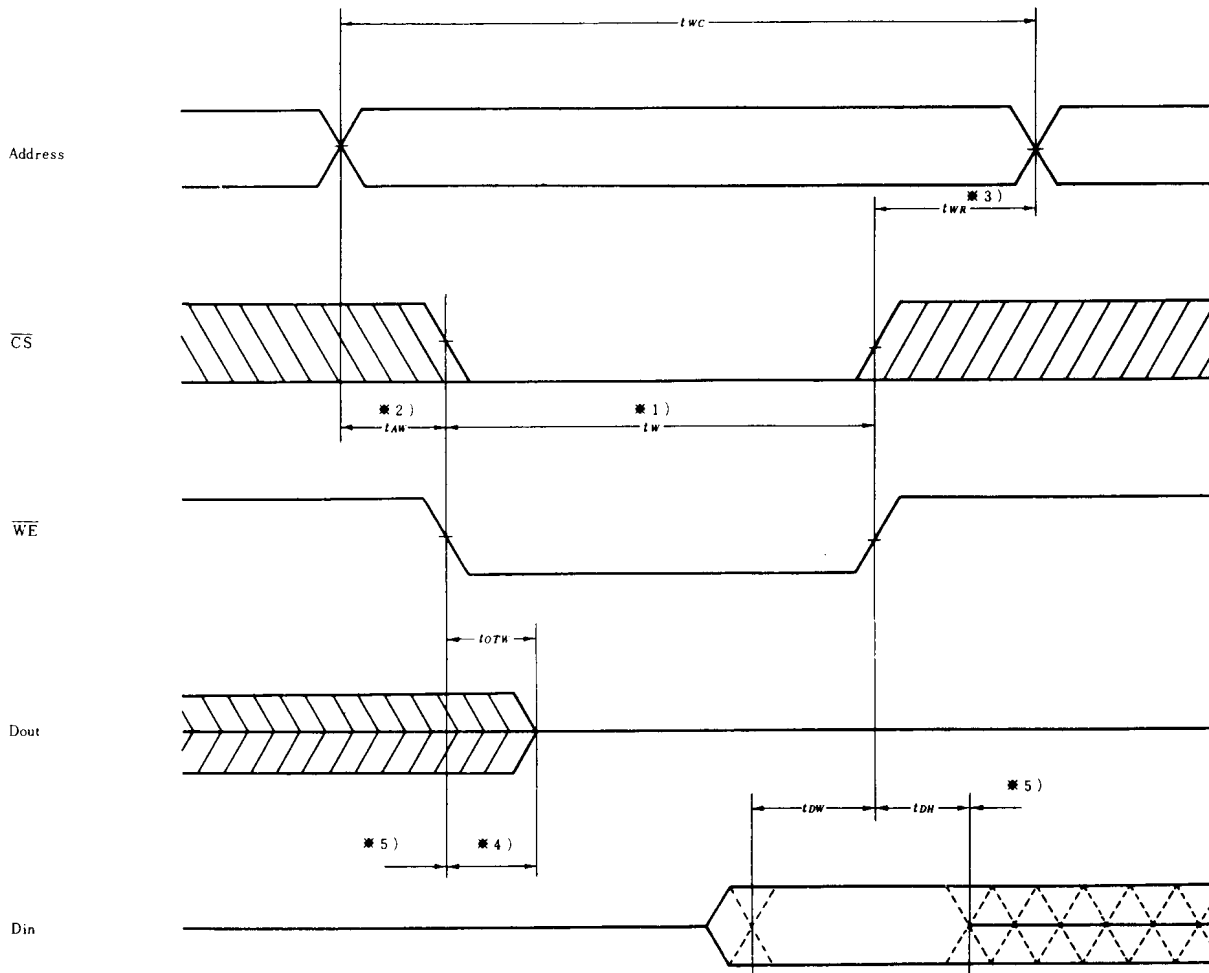
● READ CYCLE

Item	Symbol	HM472114-3, HM472114P-3		HM472114-4, HM472114P-4		Unit
		min.	max.	min.	max.	
Read Cycle Time	$t_{RC}$	300	—	450	—	ns
Access Time	$t_A$	—	300	—	450	ns
$\overline{CS}$ -to-Output Valid	$t_{CO}$	—	100	—	120	ns
$\overline{CS}$ -to-Output Active	$t_{CX}$	20	—	20	—	ns
Output 3-state from Deselection	$t_{OTD}$	—	80	—	100	ns
Output Hold from Address Change	$t_{OHA}$	50	—	50	—	ns



■ WRITE CYCLE

Item	Symbol	HM472114-3, HM472114P-3		HM472114-4, HM472114P-4		Unit
		min.	max.	min.	max.	
Write Cycle Time	$t_{WC}$	300	—	450	—	ns
Address to Write Setup Time	$t_{AW}$	20	—	50	—	ns
Write Pulse Width	$t_W$	150	—	200	—	ns
Write Release Time	$t_{WR}$	0	—	0	—	ns
Output 3-state from Write	$t_{OTW}$	—	80	—	100	ns
Data-to-Write Time Overlap	$t_{DW}$	150	—	200	—	ns
Data Hold from Write Time	$t_{DH}$	0	—	0	—	ns



- Notes: 1)  $\overline{CS}$  and  $\overline{WE}$  are paced in the WRITE state during low level period ( $t_W$ ).
- 2)  $t_{AW}$  is an interval from the address setting through fall of the pulse,  $\overline{CS}$  or  $\overline{WE}$ .
- 3)  $t_W$  is from the earlier rise pulse of  $\overline{CS}$  or  $\overline{WE}$  till the end of the light cycle ( $t_{WC}$ ).
- 4) During this period the pulse is output so that the input signal which is the same in phase with the output may be applied to the I/O terminal.
- 5) During this period, when the  $\overline{CS}$  signal is at low level, the pulse is output so that the input signal which is the same in phase with the output data may be applied, if required. Do not however apply the input signal of reverse phase.