

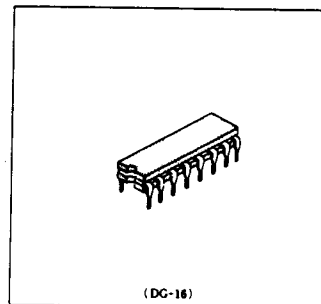
256-word × 1-bit Fully Decoded Random Access Memory

The HM10414 is ECL 10K compatible, 256-word × 1-bit, read write, random access memory developed for high speed systems such as scratch pad and control/buffer storages.

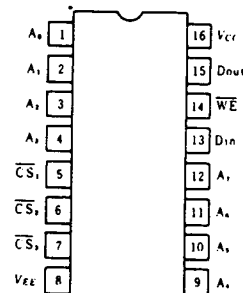
The fabrication process uses the Hitachi's low capacitance, oxide isolation method with double metalization.

The HM10414 is encapsulated in cerdip-16pin package, compatible with Fairchild's F10414.

- Fully compatible with 10K ECL level
- Address access time: HM10414: 10ns (max.)
HM10414-1: 8ns (max.)
- Write pulse width: 6ns (min.)
- Three chip select pins
- Output obtainable by wired-OR (open emitter)



PIN ARRANGEMENT



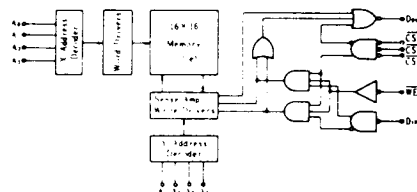
TRUTH TABLE

Input			Output	Mode
CS	WE	Din		
any one H	X	X	L	Not Selected
all L	L	L	L	Write "0"
all L	L	H	L	Write "1"
all L	H	X	Dout *	Read

X : Don't care

* : Read out non-inverted

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage	V_{EE} to V_{CC}	+0.5 to -7.0	V
Input Voltage	V_{in}	+0.5 to V_{EE}	V
Output Current	I_{out}	-30	mA
Storage Temperature	T_{stg}	-65 to +150	°C
Storage Temperature	$T_{stg}(Bias)^*$	-55 to +125	°C

* Under Bias



■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V_{EE} = -5.2V$, $R_L = 50\Omega$ to $-2.0V$, $T_a = 0$ to $+75^\circ C$, air flow exceeding 2m/sec)

Item	Symbol	Test Condition		min (B)	typ	max (A)	Unit	
Output Voltage	V_{OH}	$V_{IN} = V_{IH\&A} \text{ or } V_{IL\&B}$		0°C	−1000	—	−840	mV
				+25°C	−960	—	−810	
				+75°C	−900	—	−720	
	V_{OL}			0°C	−1870	—	−1665	
				+25°C	−1850	—	−1650	
				+75°C	−1830	—	−1625	
Output Threshold Voltage	$V_{OH\&C}$	$V_{IN} = V_{IH\&B} \text{ or } V_{IL\&A}$		0°C	−1020	—	—	mV
				+25°C	−980	—	—	
				+75°C	−920	—	—	
	$V_{OL\&C}$			0°C	—	—	−1645	
				+25°C	—	—	−1630	
				+75°C	—	—	−1605	
Input Voltage	V_{IH}	Guaranteed Input Voltage High for All Inputs		0°C	−1145	—	−840	mV
				+25°C	−1105	—	−810	
				+75°C	−1045	—	−720	
	V_{IL}	Guaranteed Input Voltage Low for All Inputs		0°C	−1870	—	−1490	
				+25°C	−1850	—	−1475	
				+75°C	−1830	—	−1450	
Input Current	I_{IH}	$V_{IN} = V_{IH\&A}$		0 to +75°C	—	—	220	μA
	I_{IL}	CS	$V_{IN} = V_{IL\&B}$	0 to +75°C	0.5	—	170	
		Other			−50	—	—	
Supply Current	I_{LF}	All Input and Output Open, Test Pin 8		+75°C	—	−130	—	mA
				0°C	−180	−140	—	

● AC CHARACTERISTICS

($V_{EE} = -5.2V \pm 5\%$, $T_a = 0$ to $+75^\circ\text{C}$, air flow exceeding 2m/sec, see test circuit and waveforms)

1. READ MODE

Item	Symbol	Test Condition	HM10414			HM10414-1			Unit
			min	typ	max	min	typ	max	
Chip Select Access Time	t_{AC}		—	3	6	—	3	6	ns
Chip Select Recovery Time	t_{CS}		—	3	6	—	3	6	ns
Address Access Time	t_{AA}		—	7	10	—	6	8	ns

2. WRITE MODE

Item	Symbol	Test Condition	HM10414			HM10414-1			Unit
			min	typ	max	min	typ	max	
Write Pulse Width	t_{w}	$t_{wSA} = 2\text{ns}$	6	4	—	6	4	—	ns
Data Setup Time	t_{wSD}		1	0	—	1	0	—	ns
Data Hold Time	t_{wHD}		1	0	—	1	0	—	ns
Address Setup Time	t_{wSA}	$t_w = 6\text{ns}$	2	0	—	2	0	—	ns
Address Hold Time	t_{wHA}		2	0	—	2	0	—	ns
Chip Select Setup Time	t_{wSCS}		1	0	—	1	0	—	ns
Chip Select Hold Time	t_{wSCS}		1	0	—	1	0	—	ns
Write Disable Time	t_{wS}		—	—	5	—	—	5	ns
Write Recovery Time	t_{wR}		—	—	12	—	—	10	ns

3. RISE/FALL TIME

Item	Symbol	Test Condition	min	typ	max	Unit
Output Rise Time	t_r		—	1.5	2.5	ns
Output Fall Time	t_f		—	1.5	2.5	ns

4. CAPACITANCE

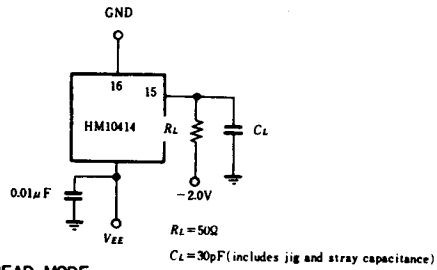
Item	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_i		—	3	5	pF
Output Capacitance	C_{out}		—	5	8	pF



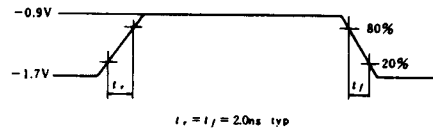
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■ TEST CIRCUIT AND WAVEFORMS

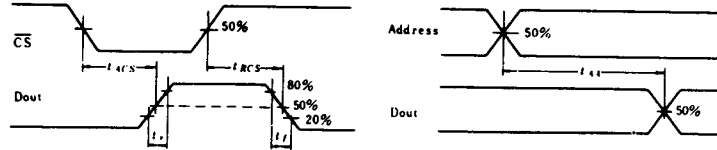
1. LOADING CONDITIONS



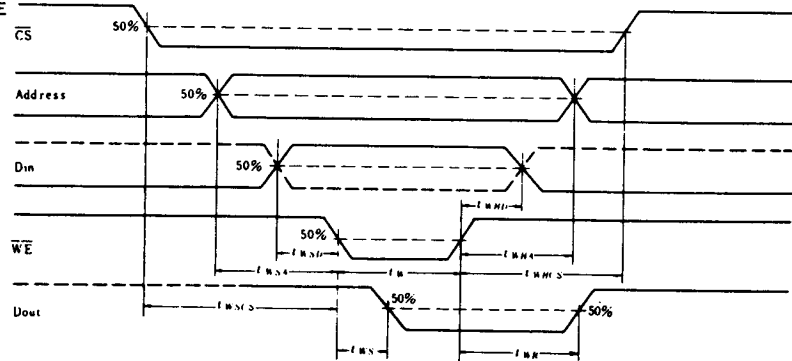
2. INPUT PULSE



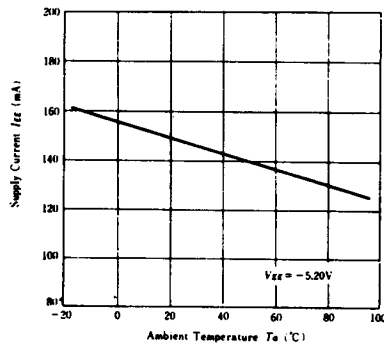
3. READ MODE



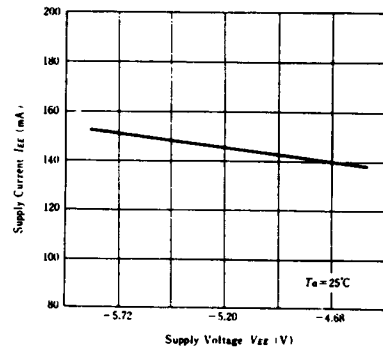
4. WRITE MODE



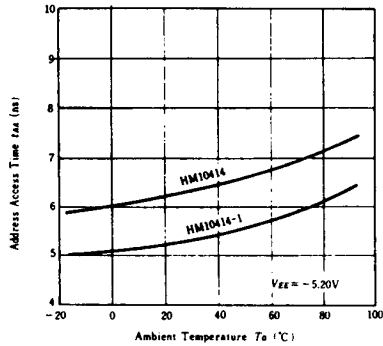
**SUPPLY CURRENT
vs. AMBIENT TEMPERATURE**



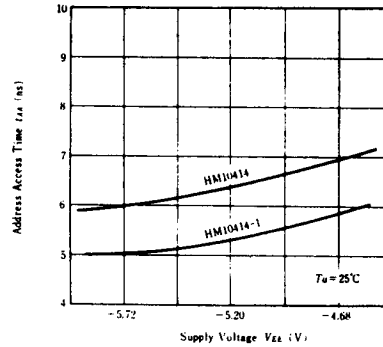
**SUPPLY CURRENT
vs. SUPPLY VOLTAGE**



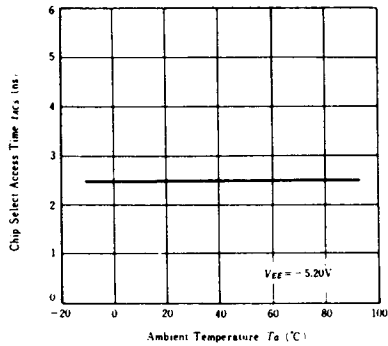
**ADDRESS ACCESS TIME
vs. AMBIENT TEMPERATURE**



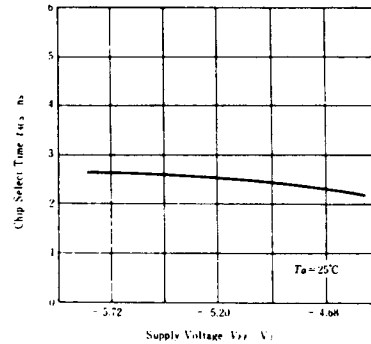
**ADDRESS ACCESS TIME
vs. SUPPLY VOLTAGE**



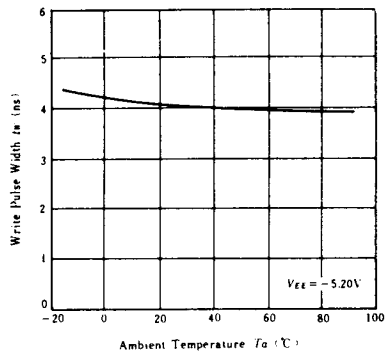
**CHIP SELECT ACCESS TIME
vs. AMBIENT TEMPERATURE**



**CHIP SELECT ACCESS TIME
vs. SUPPLY VOLTAGE**



**WRITE PULSE WIDTH
vs. AMBIENT TEMPERATURE**



**WRITE PULSE WIDTH
vs. SUPPLY VOLTAGE**

