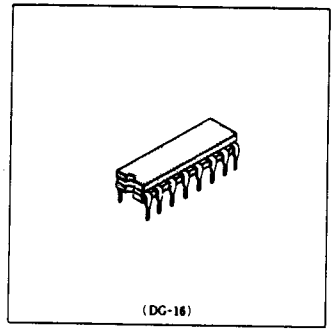
256-word × 1-bit Fully Decoded Random Access Memory

The HM10414 is ECL 10K compatible, 256-word x 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)

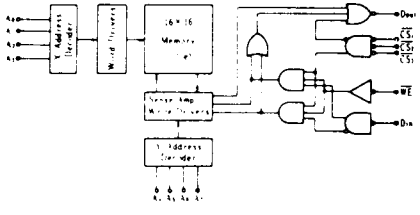


■ TRUTH TABLE

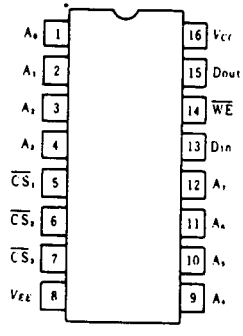
Input			Output	Mode
$\overline{CS}$	$\overline{WE}$	Din		
any one H	×	×	L	Not Selected
all L	L	L	L	Write "0"
all L	L	H	L	Write "1"
all L	H	×	Dout*	Read

× : Don't care
* : Read out non-inverted

■ BLOCK DIAGRAM



■ PIN ARRANGEMENT



(Top View)

■ 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

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■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS (V_{EE} = −5.2V, R_L = 50Ω to −2.0V, Ta = 0 to +75°C, air flow exceeding 2m/sec)

Item	Symbol	Test Condition		min (B)	typ	max (A)	Unit
Output Voltage	V_{OH}	V_{IN} = V_{IHA} or V_{ILB}	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_{OHC}	V_{IN} = V_{IHB} or V_{ILA}	0°C	−1020	—	—	mV
			+25°C	−980	—	—	
			+75°C	−920	—	—	
	V_{OLC}		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_{IHA}	0 to +75°C	—	—	220	μA
	I_{IL}	$\overline{CS}$ (V_{IN} = V_{ILB})	0 to +75°C	0.5	—	170	
		Other		−50	—	—	
Supply Current	I_{EE}	All Input and Output Open, Test Pin 8	+75°C	—	−130	—	mA
			0°C	−180	−140	—	

● AC CHARACTERISTICS

(V_{EE} = −5.2V ± 5%, Ta = 0 to +75°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_{ACR}		—	3	6	—	3	6	ns
Chip Select Recovery Time	t_{RCS}		—	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} = 2ns	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 = 6ns	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_{WHCS}		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

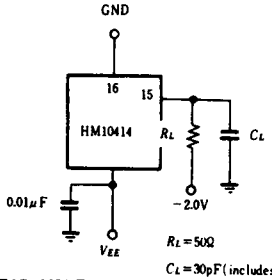
Item	Symbol	Test Condition	min	typ	max	Unit
Output Rise Time	t_r		—	1.5	2.5	ns
Output Fall Time	t_f		—	1.5	2.5	ns

4. CAPACITANCE

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

■ TEST CIRCUIT AND WAVEFORMS

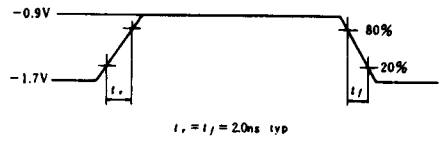
1. LOADING CONDITIONS



R_L=50Ω

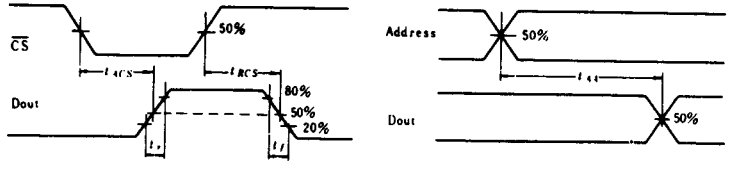
C_L=30pF (includes jig and stray capacitance)

2. INPUT PULSE

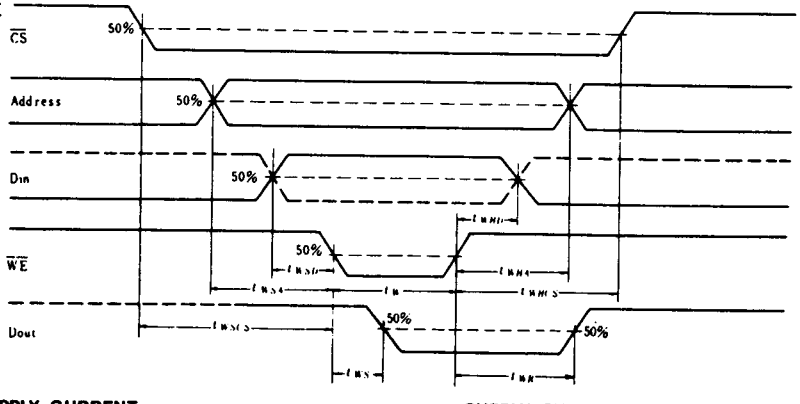


$t_r = t_f$ = 2.0ns typ

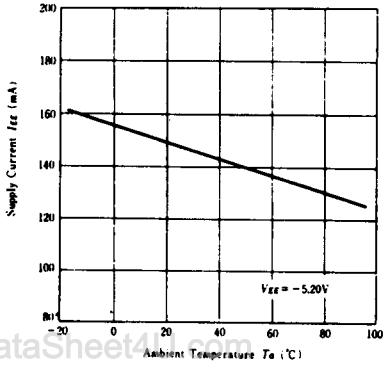
3. READ MODE



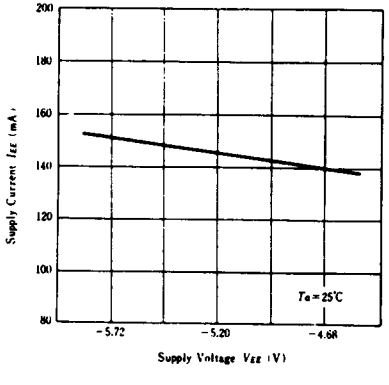
4. WRITE MODE



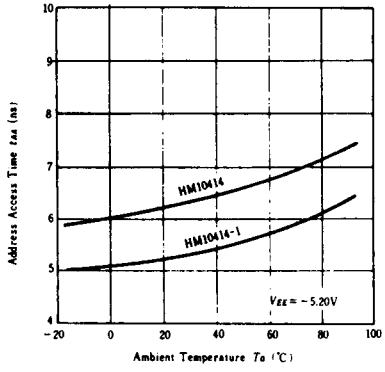
SUPPLY CURRENT vs. AMBIENT TEMPERATURE



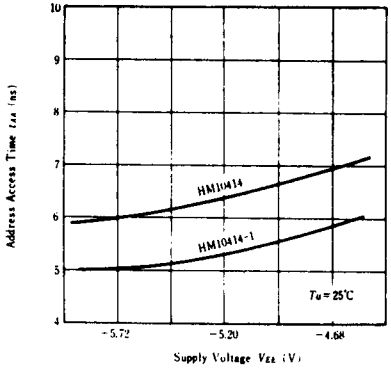
SUPPLY CURRENT vs. SUPPLY VOLTAGE



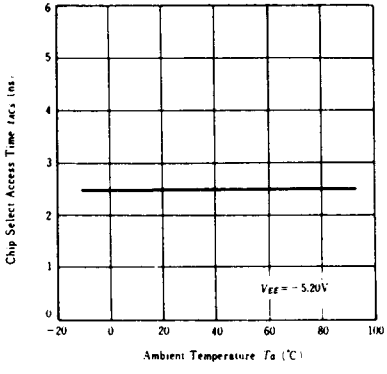
ADDRESS ACCESS TIME vs. AMBIENT TEMPERATURE



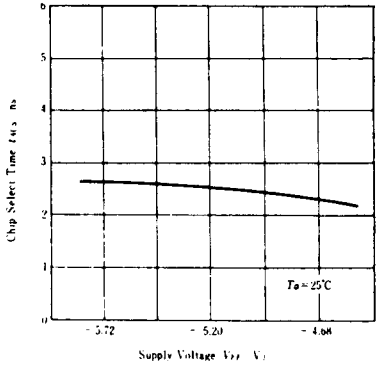
ADDRESS ACCESS TIME vs. SUPPLY VOLTAGE



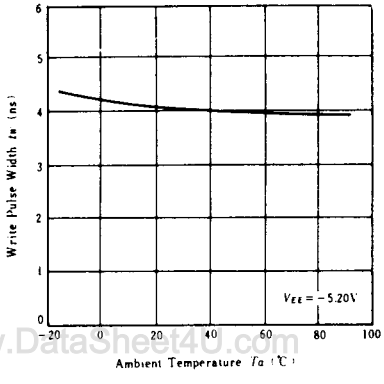
CHIP SELECT ACCESS TIME vs. AMBIENT TEMPERATURE



CHIP SELECT ACCESS TIME vs. SUPPLY VOLTAGE



WRITE PULSE WIDTH vs. AMBIENT TEMPERATURE



WRITE PULSE WIDTH vs. SUPPLY VOLTAGE