

HM10470-20

4096-word $\times$ 1-bit Fully Decoded Random Access Memory

The HM10470 is ECL 10K compatible, 4096-words $\times$ 1-bit, read/write, random access memory developed for high speed systems such as scratch pads and control/buffer storages.

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

The HM10470 is encapsulated in cerdip-18 pin package, compatible with Fairchild's F10470.

FEATURES

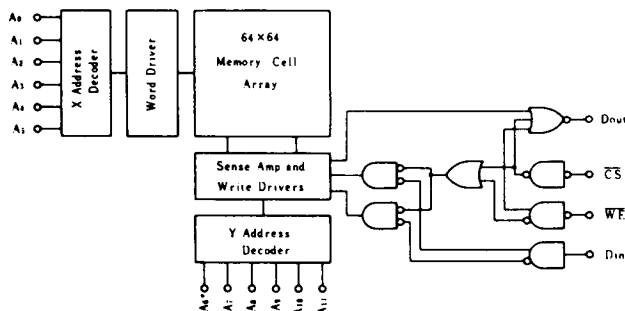
- 4096-word $\times$ 1-bit organization
- Fully compatible with 10K ECL level
- Address access time: 20ns (max)
- Write pulse width: 20ns (min)
- Low power dissipation: 0.25 mW/bit
- Output obtainable by wired-OR (open emitter)

TRUTH TABLE

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

Notes) X : Irrelevant
* : Read Out Noninvert

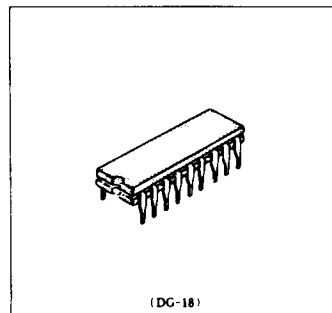
BLOCK DIAGRAM



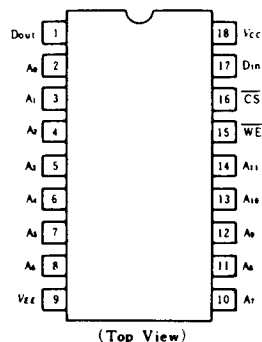
ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Storage Temperature	$T_{stg}(\text{Bias})^*$	-55 to +125	$^\circ\text{C}$

* Under Bias



PIN ARRANGEMENT



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}	$V_{IN} = V_{INA}$ 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}	$V_{IN} = V_{INB}$ 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_{IN}	$V_{IN} = V_{INA}$		0 to +75°C	—	—	220	μA
					I_{IL}	$\overline{CS}$	0 to +75°C	
	Other	$V_{IN} = V_{ILB}$	—	—		—		
Supply Current	I_{EE}	All Input and Output Open, Test Pin 12		$T_a = 0^\circ C$	-260	-220	—	mA
				$T_a = 75^\circ C$	—	-210	—	

● **AC CHARACTERISTICS** ($V_{EE} = -5.2V \pm 5\%$, $T_a = 0$ to $+75^\circ C$, air flow exceeding 2m/sec)

1. READ MODE

Item	Symbol	Test Condition	min	typ	max	Unit
Chip Select Access Time	t_{ACS}		—	—	8	ns
Chip Select Recovery Time	t_{RCS}		—	—	8	ns
Address Access Time	t_{AA}		—	—	20	ns

2. WRITE MODE

Item	Symbol	Test Condition	min	typ	max	Unit
Write Pulse Width	t_w	$t_{WSA} = 3ns$	20	—	—	ns
Data Setup Time	t_{WSD}		3	—	—	ns
Data Hold Time	t_{WHD}		2	—	—	ns
Address Setup Time	t_{WSA}		3	—	—	ns
Address Hold Time	t_{WHA}	$t_w = 20ns$	2	—	—	ns
Chip Select Setup Time	t_{WSCS}		3	—	—	ns
Chip Select Hold Time	t_{WHCS}		2	—	—	ns
Write Disable Time	t_{WS}		—	—	8	ns
Write Recovery Time	t_{WR}		—	—	22	ns



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3. RISE/FALL TIME

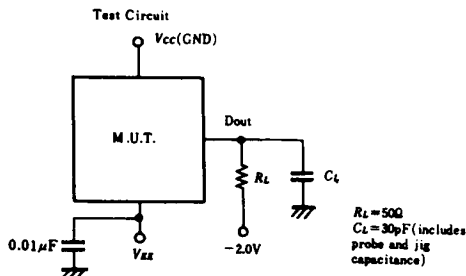
Item	Symbol	Test Condition	min	typ	max	Unit
Output Rise Time	t_r		—	2	—	ns
Output Fall Time	t_f		—	2	—	ns

4. CAPACITANCE

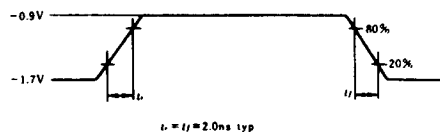
Item	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_{in}		—	3	—	pF
Output Capacitance	C_{out}		—	5	—	pF

■ TEST CIRCUIT AND WAVEFORMS

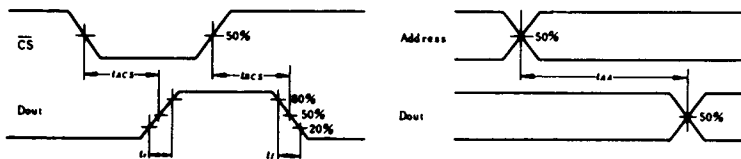
1. LOADING CONDITION



2. INPUT PULSE



3. READ MODE



4. WRITE MODE

