

65,536-Words x 4-Bit Random Access Memory

■ DESCRIPTION

The Hitachi HM101504 is ECL 100k compatible, 65,536 words by 4 bits read/write random access memory developed for high speed systems such as cache and control/buffer storage.

■ FEATURES

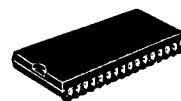
- 65,536-words x 4 bit organization
- Fully compatible with 100k ECL level
- 0.8 μ m Hi-BiCMOS process
- Address access time: 10/12 ns (max.)
- Write pulse width: 7/9 ns (min.)
- Low power dissipation: 500 mW (typ.)
- Output obtainable by wired-OR (open emitter)

■ ORDERING INFORMATION

Type No.	Cycle Time	Package
HM101504F-10	10 ns	400 mil 32 pin
HM101504F-12	12 ns	Plastic SOJ (CP-32D)

■ PIN DESCRIPTION

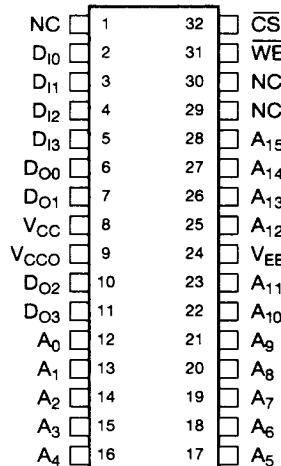
Pin Name	Function
A ₀ -A ₁₅	Address Input
D ₁₀ -D ₁₃	Data Input
D ₀₀ -D ₀₃	Data Output
$\overline{WE}$	Write Enable
$\overline{CS}$	Chip Select
V _{CC}	Ground
V _{EE}	Supply Voltage



(CP-32D)

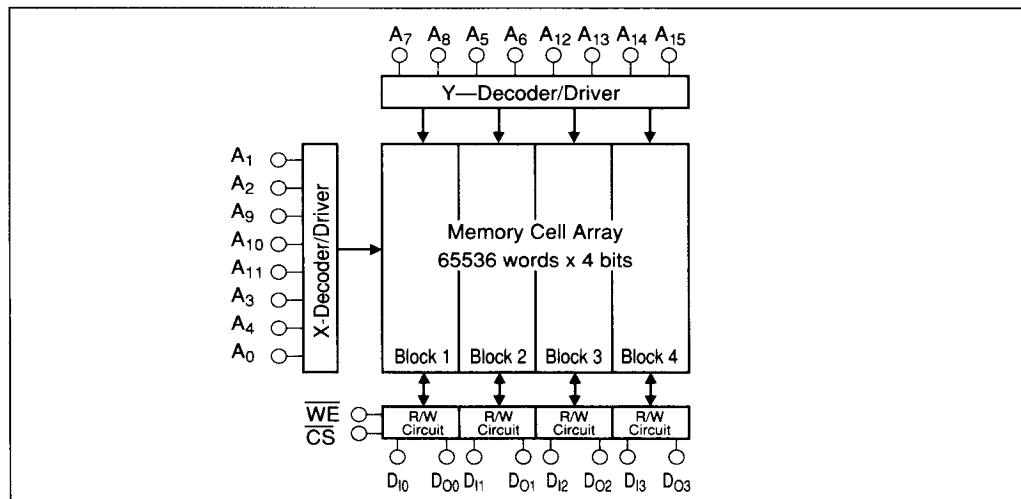
■ PIN ARRANGEMENT

HM101504 Series



(Top View)

■ BLOCK DIAGRAM



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■ FUNCTION TABLE

Input		D _{in}	Output	Mode
$\overline{\text{CS}}$	$\overline{\text{WE}}$			
H	X ¹	X ¹	L	Not Selected
L	L	L	L	Write "0"
L	L	H	L	Write "1"
L	H	X ¹	D _{out} ²	Read

Notes: 1. Irrelevant
2. Read Out Noninvert

■ ABSOLUTE MAXIMUM RATING (T_j = 125°C max)

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
Power Dissipation	P _T	1.2	W
Operating Temperature	T _{opr} ²	0 to +85	°C
Storage Temperature	T _{stg}	-55 to +125	°C
Storage Temperature	T _{stg} (bias) ^{1, 2}	-10 to +85	°C

Note: 1. Under bias (V_{EE} = -6.0V min.)
2. Case temperature

■ ELECTRICAL CHARACTERISTICS

• DC Characteristics (V_{EE} = -5.2V, R_L = 50Ω to -2.0V, T_C = 0 to +85°C)

Item	Symbol	Min (B)	Typ	Max (A)	Unit	Test Condition
Output Voltage	V _{OH}	-1025	-955	-880	mV	V _{in} = V _{IHA} or V _{ILB}
	V _{OL}	-1810	-1715	-1620	mV	
Output Threshold Voltage	V _{OHC}	-1035	—	—	mV	V _{in} = V _{IHB} or V _{ILA}
	V _{OLC}	—	—	-1610	mV	
Input Voltage	V _{IH}	-1165	—	-880	mV	Guaranteed Input Voltage High/Low for All Inputs
	V _{IL}	-1810	—	-1475	mV	
Input Current	I _{IH}	—	—	220	μA	V _{in} = V _{IHA}
	I _{IL}	0.5	—	170	μA	V _{in} = V _{ILB} ($\overline{\text{CS}}$)
		-50	—	—	μA	V _{in} = V _{ILB} (Others)
Supply Current	I _{EE}	-180	—	—	mA	All Inputs and Outputs Open

■ AC CHARACTERISTICS (V_{EE} = -5.2V ± 5%, T_C = 0 to +85°C)

• Read Mode

Item	Symbol	HM101504-10			HM101504-12			Unit	Test Condition
		Min	Typ	Max	Min	Typ	Max		
Chip Select Access Time	t _{ACS}	—	—	6	—	—	7	ns	
Chip Select Recovery Time	t _{RCS}	—	—	6	—	—	7	ns	
Address Access Time	t _{AA}	—	—	10	—	—	12	ns	



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• Write Mode

Item	Symbol	HM101504-10			HM101504-12			Unit	Test Condition
		Min	Typ	Max	Min	Typ	Max		
Write Pulse Width	tw	7	—	—	9	—	—	ns	tWSA = tWSA min
Data Setup Time	tWSD	1	—	—	1	—	—	ns	
Data Hold Time	tWHD	1	—	—	1	—	—	ns	
Address Setup Time	tWSA	1	—	—	1	—	—	ns	tw = tw min
Address Hold Time	tWHA	2	—	—	2	—	—	ns	
Chip Select Setup Time	tWSCS	1	—	—	1	—	—	ns	
Chip Select Hold Time	tWHCS	1	—	—	1	—	—	ns	
Write Disable Time	tWS	—	—	6	—	—	6	ns	
Write Recovery Time	tWR	—	—	12	—	—	14	ns	

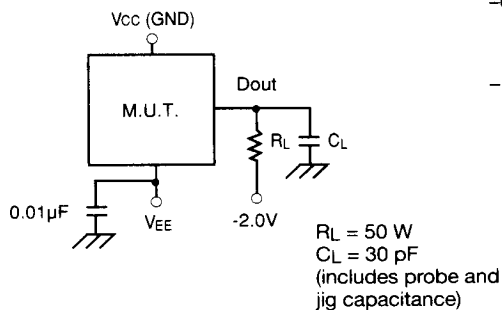
• Rise/Fall Time

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Output Rise Time	tr	—	2	—	ns	
Output Fall Time	tf	—	2	—	ns	

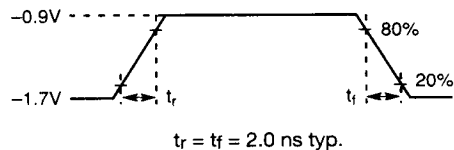
• Capacitance

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Input Capacitance	Cin	—	3	—	pF	
Output Capacitance	COUT	—	5	—	pF	

■ AC TEST CONDITION

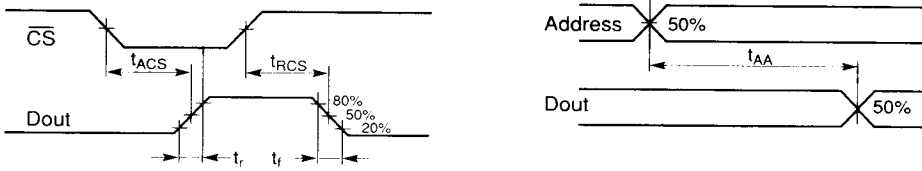


■ INPUT PULSE



TIMING WAVEFORM

Read



Write

