

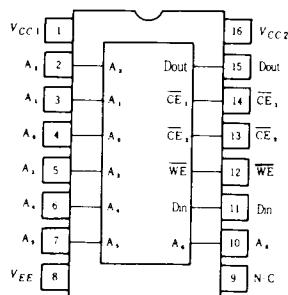
# HD10147

## 128-word × 1-bit Random Access Memory

The HD10147 is a fast 128-word × 1-bit RAM. Bit selection is achieved by means of a 7-bit address, A0 through A6. The active-low chip selects and fast chip select access time allow easy memory expansion up to 512 words without affecting system performance. The operating mode (CE

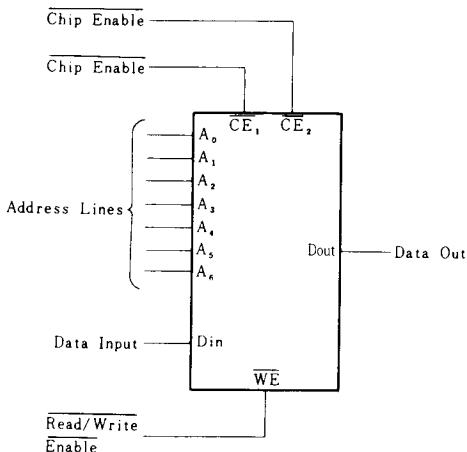
input low) is controlled by the WE input. With WE low the chip is in the write mode- the output is low and the data present at Dn is stroed at the selected address. With WE high the chip is in the read mode- the data state at the selected memory location is presented non-inverted at Dout.

### ■PIN ARRANGEMENT



(Top View)

### ■BLOCK DIAGRAM



### ■FUNCTION TABLE

Mode	Input				Output
	CE <sub>1</sub>	CE <sub>2</sub>	WE	Din	
Write "L"	L	L	L	L	L
Write "H"	L	L	L	H	L
Read	L	L	H	×	Q
Disabled	H	L	×	×	L
	L	H	×	×	L

Note) × : Don't care.

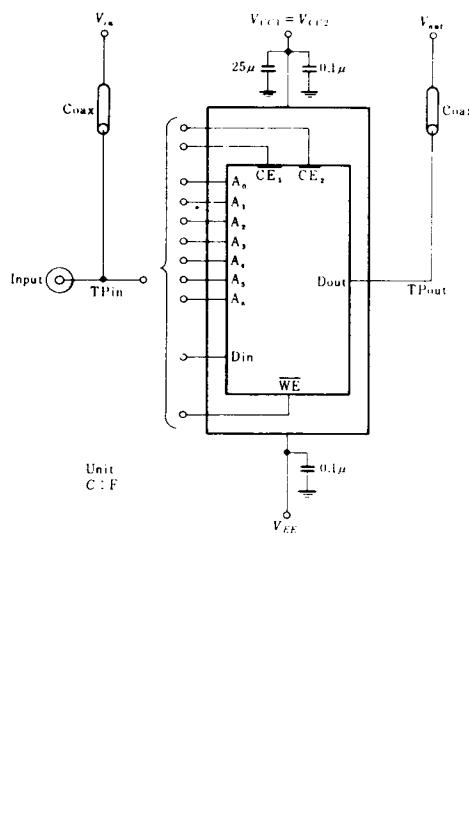
■DC CHARACTERISTICS ( $V_{EE} = -5.2V$ ,  $Ta = -30 \sim +85^\circ C$ )

Item	Symbol	Test Condition		min	typ	max	Unit
Supply Current	$I_{EE}$			25°C	—	80	100
Input Current	$I_{IH}$	$V_{IH} = -0.810V$	A, D, $\overline{CE}$	25°C	—	—	35
			$\overline{WE}$		—	—	75
	$I_{IL}$	$V_{IL} = -1.850V$	A, $\overline{WE}$	25°C	— 6.0	—	6.0
Output Voltage	$V_{OH}$	$\overline{WE} = -1.205V$ , $\overline{CE} = -1.500V$		—30°C	— 1.060	—	— 0.890
			$\overline{WE} = -1.105V$ , $\overline{CE} = -1.475V$	25°C	— 0.960	—	— 0.810
			$\overline{WE} = -1.035V$ , $\overline{CE} = -1.440V$	85°C	— 0.890	—	— 0.700
	$V_{OL}$	$\overline{WE} = -1.205V$ , $\overline{CE} = -1.500V$		—30°C	— 1.890	—	— 1.675
			$\overline{WE} = -1.105V$ , $\overline{CE} = -1.475V$	25°C	— 1.850	—	— 1.650
			$\overline{WE} = -1.035V$ , $\overline{CE} = -1.440V$	85°C	— 1.825	—	— 1.615
Output Threshold Voltage	$V_{OHA}$	$\overline{WE} = -1.205V$ , $\overline{CE} = -1.500V$		—39°C	— 1.080	—	—
			$\overline{WE} = -1.105V$ , $\overline{CE} = -1.475V$	25°C	— 0.980	—	—
			$\overline{WE} = -1.035V$ , $\overline{CE} = -1.440V$	85°C	— 0.910	—	—
	$V_{OLA}$	$\overline{CE_1}$ or $\overline{CE_2} = -1.205V$		—30°C	—	—	— 1.655
			$\overline{CE_1}$ or $\overline{CE_2} = -1.105V$	25°C	—	—	— 1.630
			$\overline{CE_1}$ or $\overline{CE_2} = -1.035V$	85°C	—	—	— 1.595

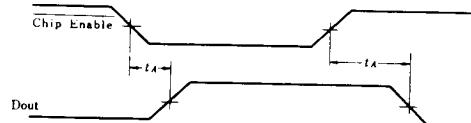
■AC CHARACTERISTICS ( $V_{EE} = -3.2V$ ,  $V_{CC} = +2.0V$ ,  $Ta = 25^\circ C$ )

Item	Symbol	Input	Output	Test Condition	min	typ	max	Unit
Access Time	$t_A$	$\overline{CE}$	Q	$R_L = 50\Omega$	—	—	8.0	ns
		$A_5$	Q		—	10	12	
		$A_6$	Q		—	9	10	
Write Strobe Mode	$t_{\text{st}}$	$D \rightarrow \overline{WE}$	Q		1.0	—	—	ns
		$\overline{CE} \rightarrow \overline{WE}$	Q		1.0	—	—	
		$A_2 \rightarrow \overline{WE}$	Q		3.0	—	—	
		$A_5 \rightarrow \overline{WE}$	Q		4.0	—	—	
Setup Time	$t_{\text{su}}$	$D \rightarrow \overline{WE}$	Q		1.0	—	—	ns
		$\overline{CE} \rightarrow \overline{WE}$	Q		1.0	—	—	
		$A_2 \rightarrow \overline{WE}$	Q		1.0	—	—	
		$A_5 \rightarrow \overline{WE}$	Q		3.0	—	—	
Hold Time	$t_h$	$D \rightarrow \overline{WE}$	Q		—	—	8.0	ns
		$\overline{CE} \rightarrow \overline{WE}$	Q		—	—	8.0	
		$A \rightarrow \overline{WE}$	Q		—	2.0	—	
Write Recovery Time	$t_{WR}$	$\overline{WE}$	Q		—	1.0	—	ns
Write Pulse Width	$t_{WPW}$	$\overline{WE}$	Q		—	—	—	ns
Rise Time	$t_{TRH}$		Q		—	—	—	ns
Fall Time	$t_{TRL}$		Q		—	—	—	ns

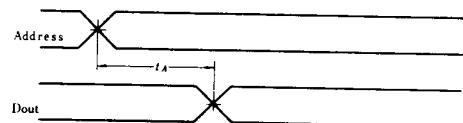
## ■SWITCHING TIME TEST CIRCUIT



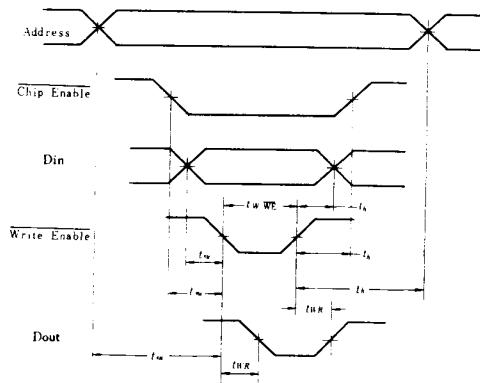
## 1. Chip Enable Access Time



## 2. Address Access Time



## 3. Write Strobe Mode



Notes)

1.  $50\Omega$  termination to ground located in each scope channel input.  
All input and output cables to the scope are equal lengths of  $50\Omega$  coaxial cable.
2. Wire length should be  $< 6.35\text{mm}$  (1/4 inch) from TPin to input pin and TPout to output pin.
3. Unused outputs connected to a  $50\Omega$  resistor to ground.