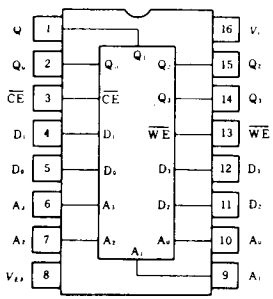
64-bit Register File

The HD10145 is a 16 word x 4-bit RAM. Bit selection is achieved by means of a 4-bit address A0 through A3. The active-low chip select allows memory expansion up to 32 words. The fast chip select access time allows memory expansion without affecting system performance. The operating mode of the RAM($\overline{CE}$ input low) is controlled by the $\overline{WE}$ input. With $\overline{WE}$ low the chip is in the write mode- the output is low and the data present at Dn is stored at the selected address.
With $\overline{WE}$ high the chip is in the read mode- The data state at the selected memory location is presented non-inverted at Qn.

■PIN ARRANGEMENT



(Top View)

■FUNCTION TABLE

Mode	Inputs			Output
	$\overline{CE}$	$\overline{WE}$	D	Q
Write "L"	L	L	L	L
Write "H"	L	L	H	L
Read	L	H	×	Q
Disabled	H	×	×	L

Note) × : Don't care.

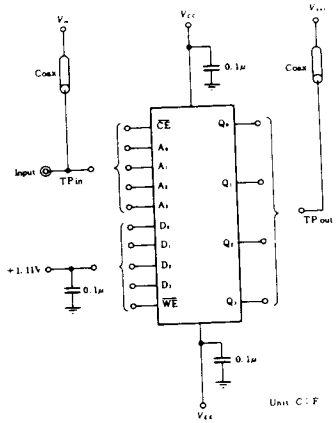
■DC CHARACTERISTICS (V_{EE} = −5.2V, Ta = −30 ~ +85°C)

Item	Symbol	Test Condition			min	typ	max	Unit
Supply Current	I_{EE}			25°C	—	120	150	mA
Input Current	I_{IH}	V_{IH} = −0.810V	$\overline{CE}$, A	25°C	—	—	200	μA
			D		—	—	220	
			$\overline{WE}$		—	—	470	
	I_{IL}	V_{IL} = −1.850V		25°C	0.5	—	—	μA
Output Voltage	V_{OH}	V_{IH} = −0.890V or V_{IL} = −1.890V		−30°C	−1.060	—	−0.890	V
		V_{IH} = −0.810V or V_{IL} = −1.850V		25°C	−0.960	—	−0.810	
		V_{IH} = −0.700V or V_{IL} = −1.825V		85°C	−0.890	—	−0.700	
	V_{OL}	V_{IL} = −1.890V or V_{IH} = −0.890V		−30°C	−1.890	—	−1.675	V
		V_{IL} = −1.850V or V_{IH} = −0.810V		25°C	−1.850	—	−1.650	
		V_{IL} = −1.825V or V_{IH} = −0.700V		85°C	−1.825	—	−1.615	
Output Threshold Voltage	V_{OHA}	V_{IHA} = −1.205V or V_{ILA} = −1.500V		−30°C	−1.080	—	—	V
		V_{IHA} = −1.105V or V_{ILA} = −1.475V		25°C	−0.980	—	—	
		V_{IHA} = −1.035V or V_{ILA} = −1.440V		85°C	−0.910	—	—	
	V_{OLA}	V_{ILA} = −1.500V or V_{IHA} = −1.205V		−30°C	—	—	−1.655	V
		V_{ILA} = −1.475V or V_{IHA} = −1.105V		25°C	—	—	−1.630	
		V_{ILA} = −1.440V or V_{IHA} = −1.035V		85°C	—	—	−1.595	

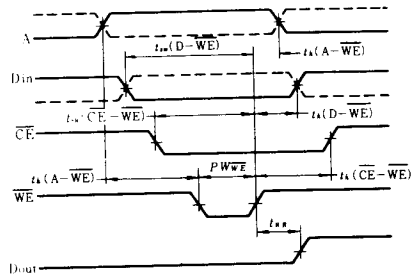
■AC CHARACTERISTICS ($V_{EE}=-3.2V$, $V_{CC}=+2.0V$, $Ta=25°C$)

Item	Symbol	Input	Output	Test Condition	min	typ	max	Unit
Access Time	t_A	$\overline{CE}$	Q	$R_L=50\Omega$	—	7.0	10	ns
		A	Q		—	10	15	
Setup Time	t_{su}	D→$\overline{WE}$	Q		—	7.5	11	ns
		$\overline{CE}$→$\overline{WE}$	Q		—	11	16	
		A→$\overline{WE}$	Q		—	3.5	6	
Hold Time	t_h	D→$\overline{WE}$	Q		—	3.0	5	ns
		$\overline{CE}$→$\overline{WE}$	Q		—	3.0	5	
		A→$\overline{WE}$	Q		—	3.5	5	
Write Recovery Time	t_{WR}	$\overline{WE}$	Q		—	7.5	11	ns
Write Pulse Width	$PW_{\overline{WE}}$	$\overline{WE}$			—	7.5	15	ns
Setup Time	t_{su}	D→$\overline{CE}$	Q		—	7.5	11	ns
		$\overline{WE}$→$\overline{CE}$	Q		—	11	16	
		A→$\overline{CE}$	Q		—	3.0	5	
Hold Time	t_h	D→$\overline{CE}$	Q		—	3.0	5	ns
		$\overline{WE}$→$\overline{CE}$	Q		—	3.0	5	
		A→$\overline{CE}$	Q		—	3.0	5	
Chip Enable Pulse Width	$PW_{\overline{CE}}$	$\overline{CE}$			—	7.5	11	ns
Rise/Fall Time	t_{TLH}		Q		—	3.0	3.3	ns
	t_{THL}				—	3.0	3.3	ns

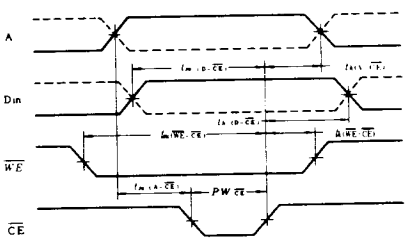
■SWITCHING TIME TEST CIRCUIT



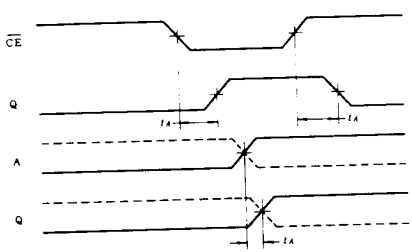
1. Write Timing-Write Strobe Mode



2. Chip Enable Strobe Mode



3. Read Timing



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