



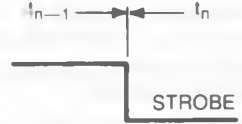
TRUTH TABLE

INPUTS					SELECT OUTPUT HC4514 — 'H' (HC4515 — 'L')
INHIBIT	A	B	C	D	
L	L	L	L	L	S0 ( $\overline{S0}$ )
L	H	L	L	L	S1 ( $\overline{S1}$ )
L	L	H	L	L	S2 ( $\overline{S2}$ )
L	H	H	L	L	S3 ( $\overline{S3}$ )
L	L	L	H	L	S4 ( $\overline{S4}$ )
L	H	L	H	L	S5 ( $\overline{S5}$ )
L	L	H	H	L	S6 ( $\overline{S6}$ )
L	H	H	H	L	S7 ( $\overline{S7}$ )
L	L	L	L	H	S8 ( $\overline{S8}$ )
L	H	L	L	H	S9 ( $\overline{S9}$ )
L	L	H	L	H	S10 ( $\overline{S10}$ )
L	H	H	L	H	S11 ( $\overline{S11}$ )
L	L	L	H	H	S12 ( $\overline{S12}$ )
L	H	L	H	H	S13 ( $\overline{S13}$ )
L	L	H	H	H	S14 ( $\overline{S14}$ )
L	H	H	H	H	S15 ( $\overline{S15}$ )
H	X	X	X	X	HC4514 — ALL OUTPUTS 'L' (HC4515 — ALL OUTPUTS 'H')

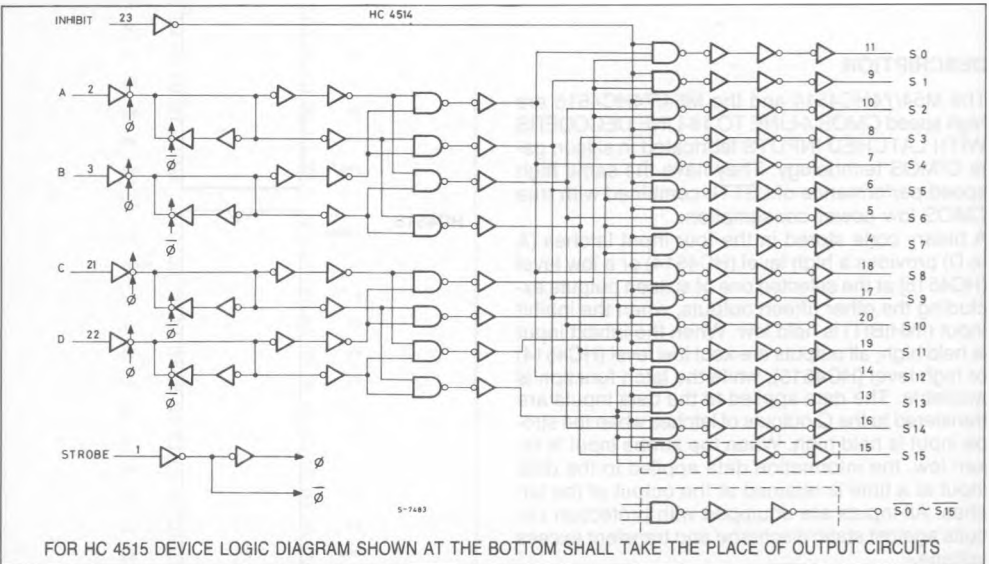
X: DON'T CARE

STROBE = 'H'  
REFER TO TRUTH TABLE

STROBE = 'L'  
DATA AT THE NEGATIVE  
GOING TRANSITION OF STROBE  
SHALL BE PROVIDED ON  
THE EACH OUPUT WHILE  
STROBE IS HELD LOW.



LOGIC DIAGRAM (HC4514)



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	- 0.5 to 7	V
$V_I$	DC Input Voltage	- 0.5 to $V_{CC} + 0.5$	V
$V_O$	DC Output Voltage	- 0.5 to $V_{CC} + 0.5$	V
$I_{IK}$	DC Input Diode Current	$\pm 20$	mA
$I_{OK}$	DC Output Diode Current	$\pm 20$	mA
$I_O$	DC Output Source Sink Current Per Output Pin	$\pm 25$	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current	$\pm 50$	mA
$P_D$	Power Dissipation	500 (*)	mW
$T_{stg}$	Storage Temperature	- 65 to 150	$^{\circ}C$

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

(\*) 500 mW:  $\equiv 65^{\circ}C$  derate to 300 mW by 10 mW/ $^{\circ}C$ :  $65^{\circ}C$  to  $85^{\circ}C$

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit	
$V_{CC}$	Supply Voltage	2 to 6	V	
$V_I$	Input Voltage	0 to $V_{CC}$	V	
$V_O$	Output Voltage	0 to $V_{CC}$	V	
$T_A$	Operating Temperature	74HC Series 54HC Series	$^{\circ}C$	
$t_r, t_f$	Input Rise and Fall Time	$V_{CC} \begin{cases} 2 \text{ V} \\ 4.5 \text{ V} \\ 6 \text{ V} \end{cases}$	0 to 1000 0 to 500 0 to 400	ns

## DC SPECIFICATIONS

Symbol	Parameter	$V_{CC}$	Test Condition	$T_A = 25^{\circ}C$ 54HC and 74HC			$-40$ to $85^{\circ}C$ 74HC		$-55$ to $125^{\circ}C$ 54HC		Unit	
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
$V_{IH}$	High Level Input Voltage	2.0 4.5 6.0		1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	— — —	1.5 3.15 4.2	— — —	V	
$V_{IL}$	Low Level Input Voltage	2.0 4.5 6.0		— — —	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	V	
$V_{OH}$	High Level Output Voltage	2.0 4.5 6.0	$V_I$	$I_O$	1.9	2.0	—	1.9	—	1.9	—	V
			$V_{IH}$ or $V_{IL}$	- 20 $\mu A$	4.4	4.5	—	4.4	—	4.4	—	
		4.5 6.0	$V_{IH}$ or $V_{IL}$	- 4.0 mA	4.18	4.31	—	4.13	—	4.10	—	
				- 5.2 mA	5.68	5.8	—	5.63	—	5.60	—	

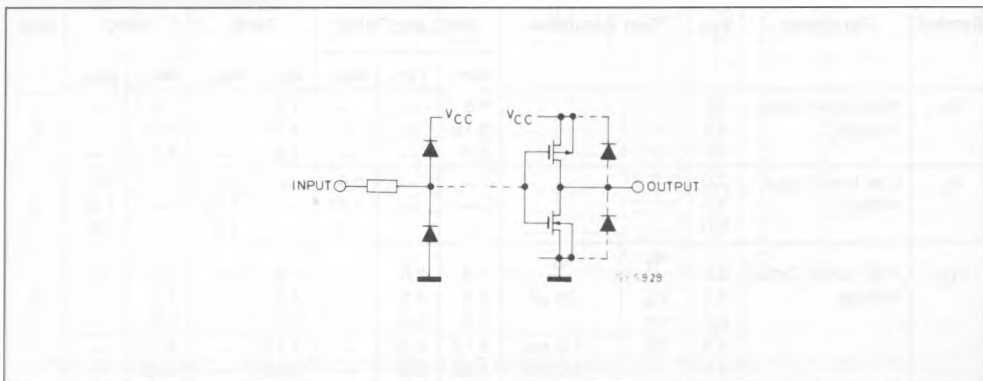
DC SPECIFICATIONS (Continued)

Symbol	Parameter	V <sub>CC</sub>	Test Condition		T <sub>A</sub> = 25°C			- 40 to 85°C		- 55 to 125°C		Unit	
					54HC and 74HC			74HC		54HC			
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
V <sub>OL</sub>	Low Level Output Voltage	2.0	V <sub>I</sub>	I <sub>O</sub>	—	0	0.1	—	0.1	—	0.1	V	
		4.5	V <sub>IH</sub> or V <sub>IL</sub>	20 μA	—	0	0.1	—	0.1	—	0.1		
		6.0			—	0	0.1	—	0.1	—	0.1		
		4.5	4.0 mA	—	0.17	0.26	—	0.33	—	0.40			
6.0	5.2 mA	—		0.18	0.26	—	0.33	—	0.40				
I <sub>I</sub>	Input Leakage Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND		—	—	±0.1	—	±1	—	±1	μA	
I <sub>CC</sub>	Quiescent Supply Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND		—	—	4	—	40	—	80	μA	

AC ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C, C<sub>L</sub> = 15pF, Input t<sub>r</sub> = t<sub>f</sub> = 6ns)

Symbol	Parameter	54HC and 74HC			Unit
		Min.	Typ.	Max.	
t <sub>TLH</sub> t <sub>THL</sub>	Output Transition Time		4	8	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (Data - S <sub>n</sub> , S <sub>n</sub> )		24	37	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (STROBE - S <sub>n</sub> , S <sub>n</sub> )		27	44	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (INHIBIT - S <sub>n</sub> , S <sub>n</sub> )		19	30	ns

INPUT AND OUTPUT EQUIVALENT CIRCUIT



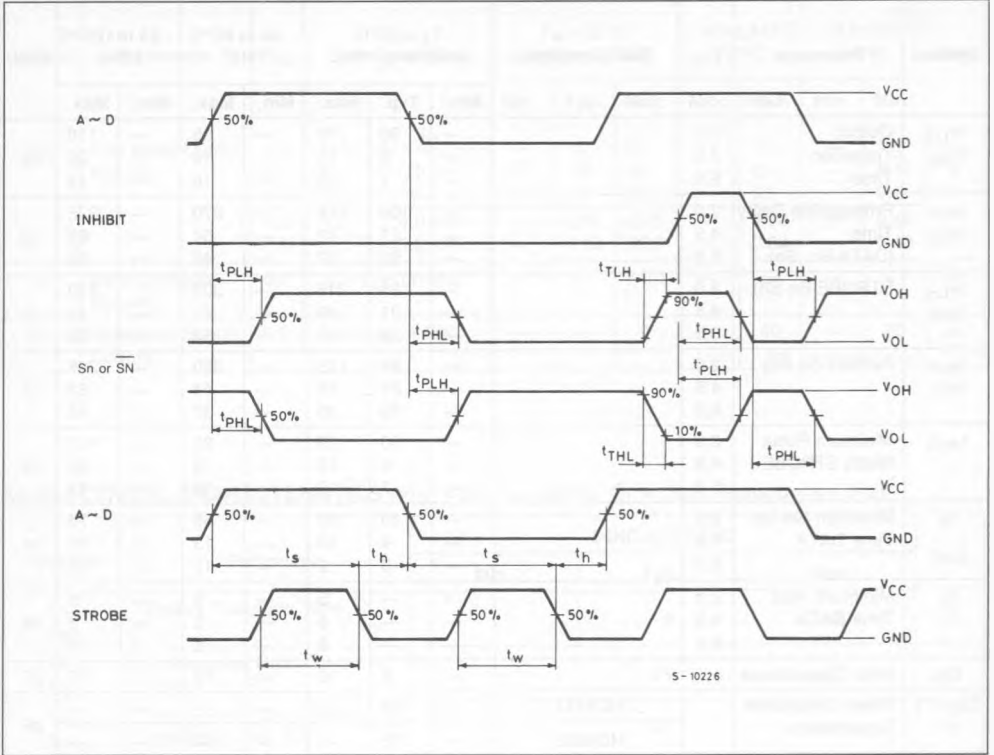
AC ELECTRICAL CHARACTERISTICS ( $C_L = 50\text{pF}$ , Input  $t_r = t_f = 6\text{ns}$ )

Symbol	Parameter	$V_{CC}$	Test Condition	$T_A = 25^\circ\text{C}$ 54HC and 74HC			$-40$ to $85^\circ\text{C}$ 74HC		$-55$ to $125^\circ\text{C}$ 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
$t_{TLH}$ $t_{THL}$	Output Transition Time	2.0		—	30	75	—	95	—	110	ns
		4.5		—	8	15	—	19	—	22	
		6.0		—	7	13	—	16	—	19	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (DATA-Sn, $\overline{\text{Sn}}$ )	2.0		—	108	215	—	270	—	325	ns
		4.5		—	27	43	—	54	—	65	
		6.0		—	23	37	—	46	—	55	
$t_{PLH}$ $t_{PHL}$	STROBE-Sn $\overline{\text{Sn}}$ )	2.0		—	124	245	—	305	—	370	ns
		4.5		—	31	49	—	61	—	74	
		6.0		—	26	42	—	52	—	63	
$t_{PLH}$ $t_{PHL}$	INHIBIT-Sn $\overline{\text{Sn}}$ )	2.0		—	88	175	—	220	—	265	ns
		4.5		—	22	35	—	44	—	53	
		6.0		—	19	30	—	37	—	45	
$t_{W(H)}$	Minimum Pulse Width STROBE	2.0		—	30	75	—	95	—	110	ns
		4.5		—	8	15	—	19	—	22	
		6.0		—	7	13	—	16	—	19	
$t_s$	Minimum Set-Up Time DATA	2.0		—	10	50	—	65	—	75	ns
		4.5		—	4	10	—	13	—	15	
		6.0		—	3	9	—	11	—	13	
$t_h$	Minimum Hold Time DATA	2.0		—	—	5	—	5	—	5	ns
		4.5		—	—	5	—	5	—	5	
		6.0		—	—	5	—	5	—	5	
$C_{IN}$	Input Capacitance			—	5	10	—	10	—	10	pF
$C_{PD} (*)$	Power Dissipation Capacitance		HC4514	—	69	—	—	—	—	—	pF
			HC4515	—	72	—	—	—	—	—	

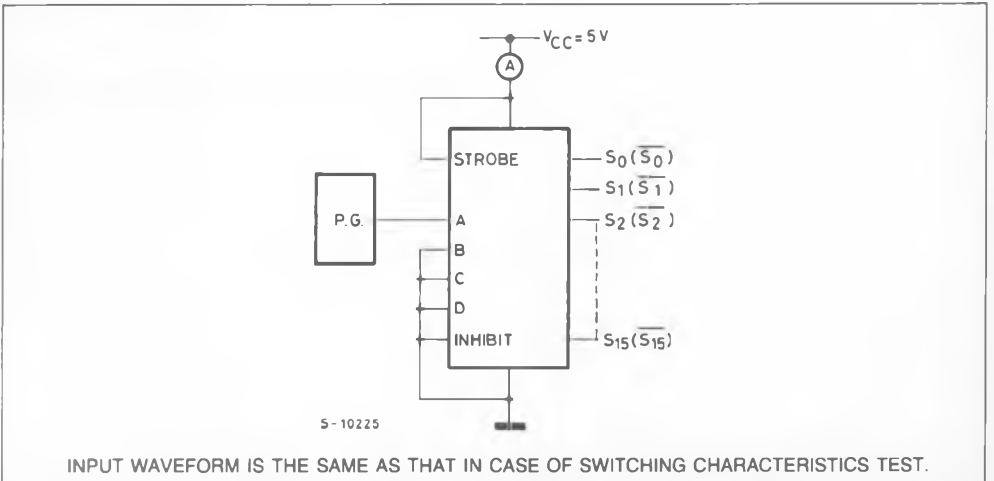
Note (\*):  $C_{PD}$  is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

Average operating current can be obtained by the following equation.  $I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$ .

SWITCHING CHARACTERISTICS TEST WAVEFORM



TEST CIRCUIT  $I_{CC}$  (Opr.)



INPUT WAVEFORM IS THE SAME AS THAT IN CASE OF SWITCHING CHARACTERISTICS TEST.