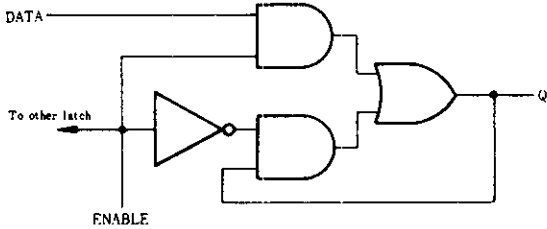


# HD74LS77 ● 4-bit Bistable Latches

The HD74LS77 is ideally suited for use as temporary storage for binary information between processing units and input/output or indicator units. Information present at a data(D) input is transferred to the Q output when the enable (G) is high and the Q output will follow the data input as long as the enable remains high. When the enable goes low the information (that was present at the data input at the time the transition occurred) is retained at the Q output until the enable is permitted to go high.

## ■ BLOCK DIAGRAM



## ■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
Pulse width	$t_w$	20	—	—	ns
Setup time	$t_{su}$	20	—	—	ns
Hold time	$t_h$	5	—	—	ns

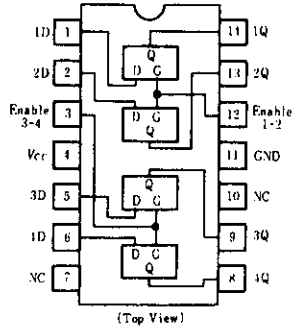
## ■ ELECTRICAL CHARACTERISTICS ( $T_a = -20 \sim +75^\circ\text{C}$ )

Item	Symbol	Test Conditions	min	typ*	max	Unit	
Input voltage	$V_{IH}$		2.0	—	—	V	
	$V_{IL}$		—	—	0.8	V	
Output voltage	$V_{OH}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}, I_{OH} = -400\mu\text{A}$	2.7	—	—	V	
	$V_{OL}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}$					
Input current	D	$I_{IH}$	$V_{CC} = 5.25\text{V}, V_I = 2.7\text{V}$	—	—	20	$\mu\text{A}$
	G			—	—	80	
	D	$I_{IL}$	$V_{CC} = 5.25\text{V}, V_I = 0.4\text{V}$	—	—	-0.4	mA
	G			—	—	-1.6	
	D	$I_I$	$V_{CC} = 5.25\text{V}, V_I = 7\text{V}$	—	—	0.1	mA
	G			—	—	0.4	
Short-circuit output current	$I_{OS}$	$V_{CC} = 5.25\text{V}$	-20	—	-100	mA	
Supply current **	$I_{CC}$	$V_{CC} = 5.25\text{V}$	—	6.9	13	mA	
Input clamp voltage	$V_{IK}$	$V_{CC} = 4.75\text{V}, I_{IK} = -18\text{mA}$	—	—	-1.5	V	

\*  $V_{CC} = 5\text{V}, T_a = 25^\circ\text{C}$

\*\*  $I_{CC}$  is measured with all outputs open and all inputs grounded.

## ■ PIN ARRANGEMENT



## ■ FUNCTION TABLE

Inputs		Output
D	G	Q
L	H	L
H	H	H
X	L	$Q_0$

Notes) H; high level, L; low level, X; irrelevant  
 $Q_0$ ; level of Q before the indicated steady-state input conditions were established.

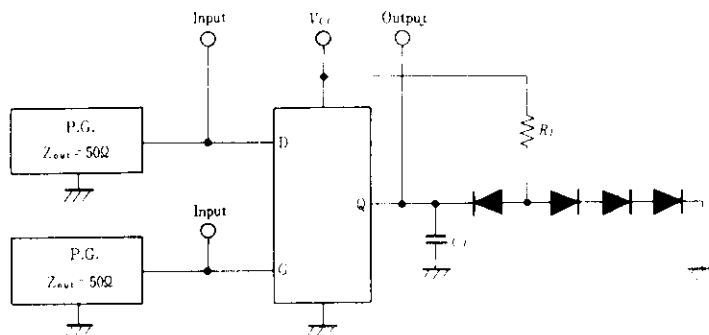
# HD74LS77

## SWITCHING CHARACTERISTICS ( $V_{CC}=5V$ , $T_a=-25^{\circ}C$ )

Item	Symbol	Input	Output	Test Conditions	min	typ	max	Unit
Propagation delay time	$t_{PLH}$	D	Q	$C_L$ 15pF $R_L$ 2k $\Omega$	-	11	19	ns
	$t_{PHL}$	-	-		-	9	17	
	$t_{PLH}$	G	Q		10	18		
	$t_{PHL}$	-	-		10	18		

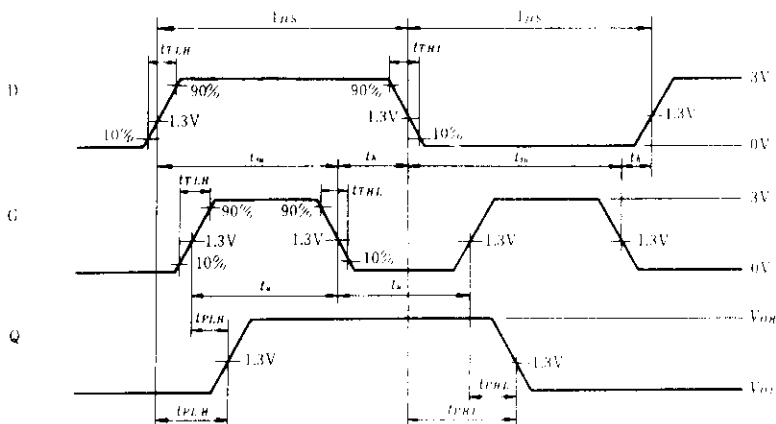
## TESTING METHOD

### 1) Test Circuit



- Notes) 1. Test is put into the each latch  
 2. All diodes are 1S2074  $\oplus$ .  
 3.  $C_L$  includes probe and jig capacitance.

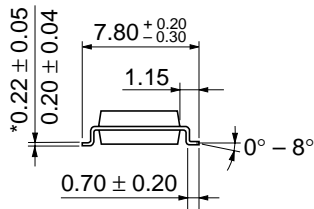
### Waveform



- Notes) 1. Input pulse;  $t_{TLH} \leq 15ns$ ,  $t_{THL} \leq 6ns$ .  
 2. When measuring propagation delay times from the D input, the corresponding G input must be held high.



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

\*Dimension including the plating thickness  
Base material dimension



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

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