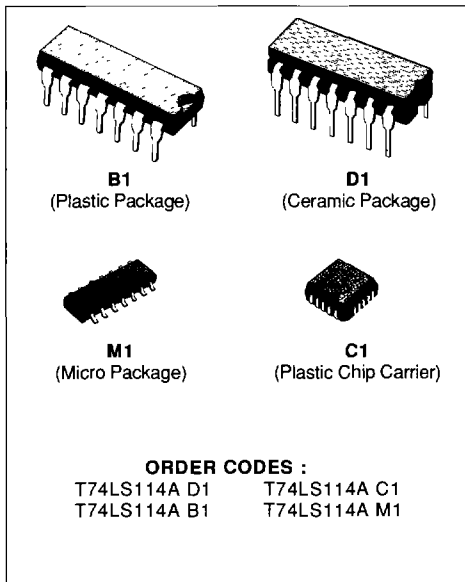


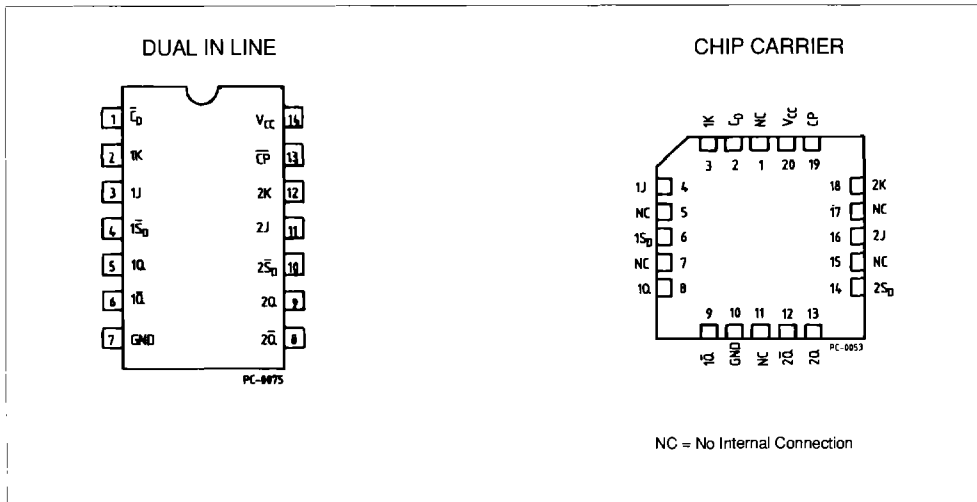
**DUAL JK NEGATIVE EDGE-TRIGGERED FLIP-FLOP**

**DESCRIPTION**

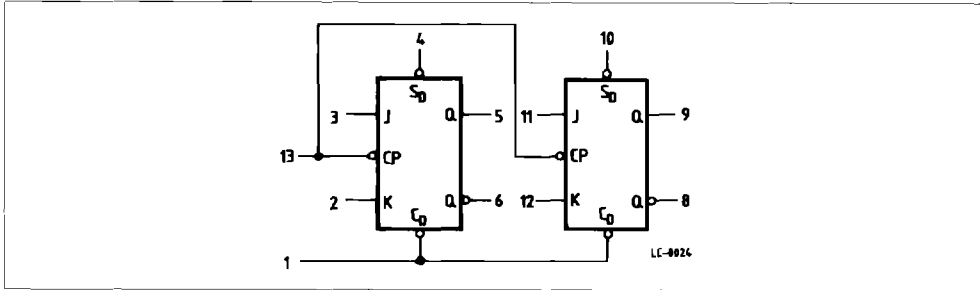
The T74LS114A offer common clock and common clear inputs and individual J, K, and set inputs. These monolithic dual flip-flops are designed so that when the clock goes HIGH, the inputs are enabled and data will be accepted. The logic level of the J and K inputs may be allowed to change when the clock pulse is HIGH and the bistable will perform according to the truth table as long as minimum set-up times are observed. Input data is transferred to the outputs on the negative-going edge of the clock pulse.



**PIN CONNECTION (top view)**



LOGIC SYMBOL



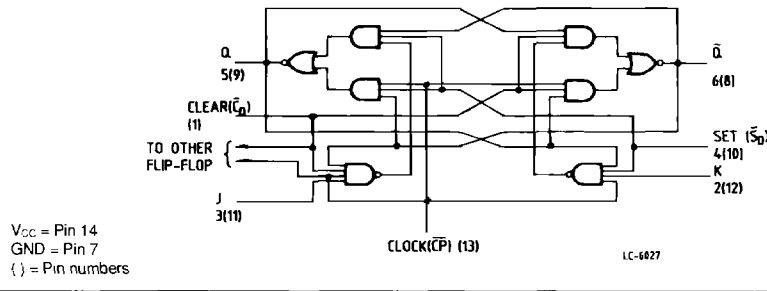
LOGIC DIAGRAM AND TRUTH TABLE

Operating Mode	Inputs				Outputs	
	$\overline{S_D}$	$\overline{C_D}$	J	K	Q	$\overline{Q}$
Set	L	H	X	X	H	L
Reset (clear)	H	L	X	X	L	H
* Undetermined	L	L	X	X	H	H
Toggle	H	H	h	h	q	q
Load "0" (reset)	H	H	l	h	L	H
Load "1" (set)	H	H	h	l	H	L
Hold	H	H	l	l	q	q

\* Both outputs will be HIGH while both  $\overline{S_D}$  and  $\overline{C_D}$  are LOW, but the output states are unpredictable if  $\overline{S_D}$  and  $\overline{C_D}$  go HIGH simultaneously.

The output levels in this configuration are not guaranteed to meet the minimum levels for  $V_{OL}$  if the lows at Preset and Clear are near  $V_{IL}$  maximum. Furthermore, this configuration is nonstable; that is, it will not persist when either Preset or Clear returns to its inactive (high) level.

H, h = HIGH Voltage Level  
 L, l = LOW Voltage Level  
 X = Don't Care  
 l, h, (q) = Lower case letters indicate the state of the referenced input (or output) one set-up time prior to the HIGH to LOW clock transition.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	- 0.5 to 7	V
$V_I$	Input Voltage, Applied to Input	- 0.5 to 15	V
$V_O$	Output Voltage, Applied to Output	- 0.5 to 10	V
$I_I$	Input Current, into Inputs	- 30 to 5	mA
$I_O$	Output Current, into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## GUARANTEED OPERATING RANGE

Part Numbers	Supply Voltage			Temperature
	Min.	Typ.	Max.	
T74LS114AXX	4.75 V	5.0 V	5.25 V	0 °C to +70 °C

XX = package type.

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter		Limits			Test Condition (note 1)	Unit
			Min.	Typ. (*)	Max.		
V <sub>IH</sub>	Input HIGH Voltage		2.0			Guaranteed Input HIGH Voltage for all Inputs	V
V <sub>IL</sub>	Input LOW Voltage				0.8	Guaranteed Input LOW Voltage for all Inputs	V
V <sub>CD</sub>	Input Clamp Diode Voltage			- 0.65	- 1.5	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18 mA	V
V <sub>OH</sub>	Output HIGH Voltage		2.7	3.4		V <sub>CC</sub> = MIN, I <sub>OH</sub> = - 400 μA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table	V
V <sub>OL</sub>	Output LOW Voltage			0.25	0.4	I <sub>OL</sub> = 4.0 mA V <sub>CC</sub> = MIN	V
				0.35	0.5	I <sub>OL</sub> = 8.0 mA V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> per Truth Table	V
I <sub>IH</sub>	Input HIGH Current	J, K Set Clear Clock			20 60 120 160	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V	μA
		J, K Set Clear Clock			0.1 0.3 0.6 0.8	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V	mA
I <sub>IL</sub>	Input LOW Current	J, K Set Clear, Clock			- 0.4 - 0.8 - 1.6	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V	mA
I <sub>OS</sub>	Output Short Circuit Current (note 2)		- 20		- 100	V <sub>CC</sub> = MAX	mA
I <sub>CC</sub>	Power Supply Current				6.0	V <sub>CC</sub> = MAX	mA

Notes : 1. For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges  
 2. Not more than one output should be shorted at a time.  
 (\*) Typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 25 °C

AC CHARACTERISTICS : T<sub>A</sub> = 25 °C

Symbol	Parameter		Limits			Test Conditions	Unit
			Min.	Typ.	Max.		
f <sub>MAX</sub>	Maximum Clock Frequency		30	45		V <sub>CC</sub> = 5.0 V C <sub>L</sub> = 15 pF	MHz
t <sub>PLH</sub>	Propagation Delay.			15	20		ns
t <sub>PHL</sub>	Clock Clear Set to Output			15	20		

AC SET-UP REQUIREMENTS :  $T_A = 25^\circ\text{C}$

Symbol	Parameter	Limits			Test Conditions	Unit
		Min.	Typ.	Max.		
$t_w$	Clock Pulse Width	20			$V_{CC} = 5.0\text{ V}$	ns
$t_w$	Clear, Set Pulse Width	25				ns
$t_s$	Set-up Time	20				ns
$t_h$	Hold Time	0				ns

AC WAVEFORMS

Figure 1 : Clock to Output Delays, Data Set-up and Hold Times, Clock Pulse Width.

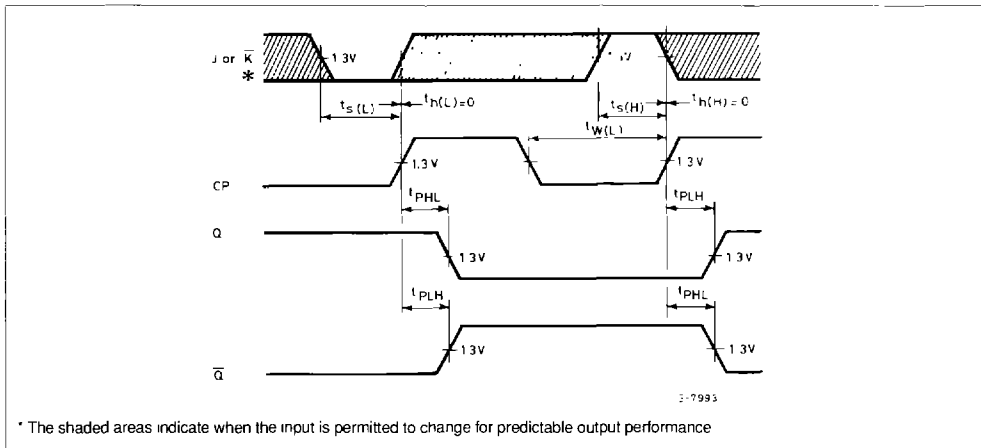


Figure 2 : Set and Clear to Output Delays, Set and Clear Pulse Widths.

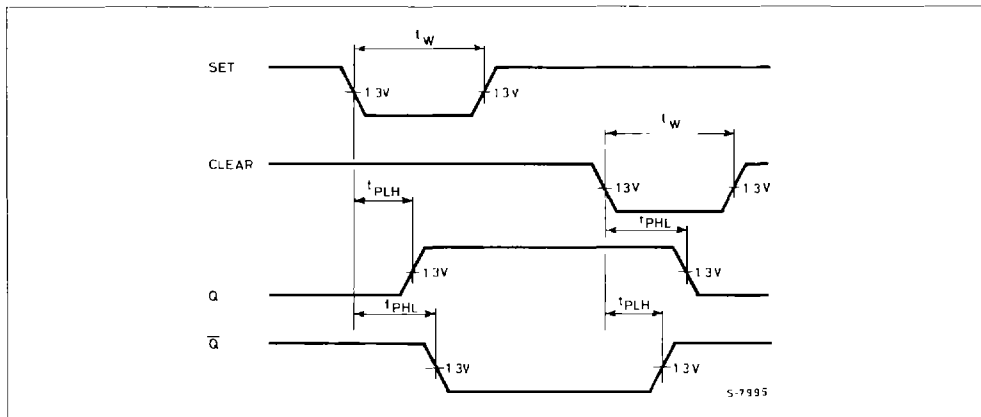


Figure 3 : Clock to Output Delays, Data Set-up and Hold Times, Clock Pulse Width.

