

**T74LS490**

T-45-23-13

**DUAL DECADE COUNTER**

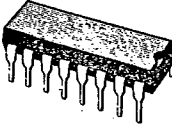
- DUAL VERSION OF 74LS90
- INDIVIDUAL ASYNCHRONOUS CLEAR AND PRESET TO 9 FOR EACH COUNTER
- COUNT FREQUENCY - TYPICALLY 35 MHz
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS
- TTL AND CMOS COMPATIBLE

**DESCRIPTION**

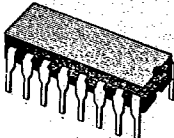
The T74LS490 contains a pair of high-speed 4-stage ripple counters. Each half of the T74LS490 has individual Clock, Master Reset and Master Set (Preset 9) inputs. Each section counts in 8, 4, 2, 1 BCD code.

**PIN NAMES**


MS	MASTER SET (set to 9) INPUT
MR	MASTER RESET
CP	CLOCK INPUT (active HIGH going edge)
Q <sub>0</sub> -Q <sub>3</sub>	COUNTER OUTPUTS




**B1**  
(Plastic Package)



**D1**  
(Ceramic Package)



**M1**  
(Micro Package)

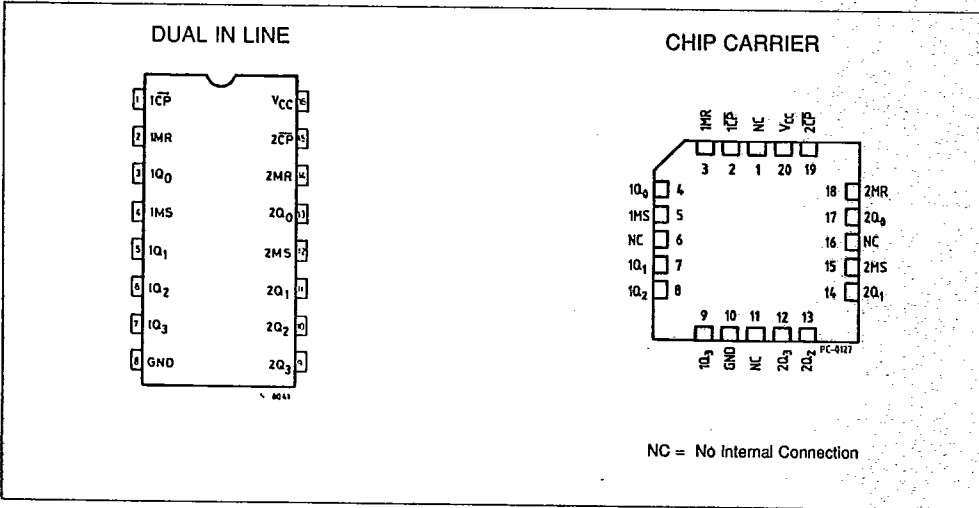


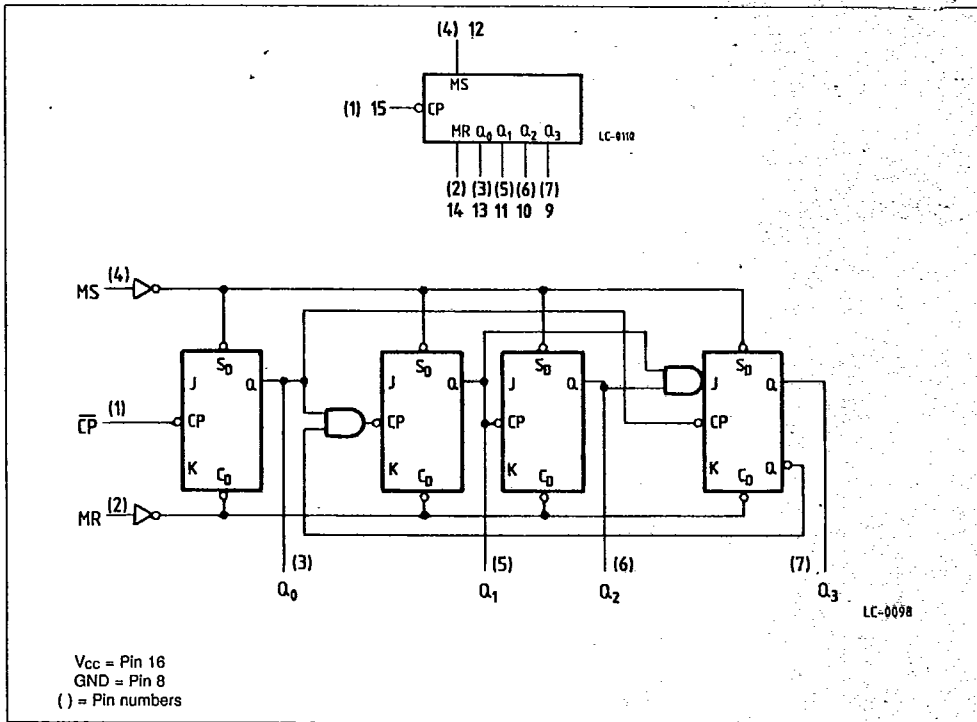
**C1**  
(Plastic Chip Carrier)

**ORDER CODES :**

T74LS490 D1	T74LS490 C1
T74LS490 B1	T74LS490 M1

**PIN CONNECTION (top view)**





**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	- 0.5 to 7	V
V <sub>I</sub>	Input Voltage, Applied to Input	- 0.5 to 5.5	V
V <sub>O</sub>	Output Voltage, Applied to Output	- 0.5 to 10	V
I <sub>I</sub>	Input Current, into Inputs	- 30 to 5	mA
I <sub>O</sub>	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 to 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.	
T74LS490XX	4.75 V	5.0 V	5.25 V	0 °C to + 70 °C

XX = Package type.

42E D ■ 7929237 0033652 6 ■ S6TH

## TRUTH TABLE

Count	Outputs			
	Q3	Q2	Q1	Q0
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H

## 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			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
			0.35	0.5	I <sub>OL</sub> = 8.0 mA	V <sub>CC</sub> = MIN, V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table
I <sub>IH</sub>	Input HIGH Current	MR, MS		20	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V	μA
		CP		60		
		CP		- 300	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V V <sub>IN</sub> = 5.5 V CP Only	μA
		MR, MS		100		
I <sub>IL</sub>	Input LOW Current	CP		- 2.4	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V	mA
		MR, MS		- 0.4		
I <sub>OS</sub>	Output Short Circuit Current (note 2)	- 20		- 100	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V	mA
I <sub>CC</sub>	Power Supply Current		19	30	V <sub>CC</sub> = MAX	mA

Notes : 1. For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating conditions for the device type.  
 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 :  $T_A = 25^\circ\text{C}$

Symbol	Parameter	Limits			Test Conditions	Unit
		Min.	Typ.	Max.		
$f_{MAX}$	Maximum Input Count Frequency	25	35		Fig. 1	MHz
$t_{PLH}$ $t_{PHL}$	Propagation Delay, CP to $Q_0$		12 13	20 20	Fig. 1	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay, CP to $Q_1$ or $Q_3$		24 26	39 39	Fig. 3	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay, CP to $Q_2$		32 36	54 54	Fig. 2	ns
$t_{PHL}$	Propagation Delay, MR to Output		24	39	Fig. 2	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay, MS to Output	$Q_0, Q_3$	24	39	Fig. 2	ns
		$Q_1, Q_2$	20	36		

$V_{CC} = 5.0\text{ V}$   
 $C_L = 15\text{ pF}$   
 $R_L = 2\text{ k}\Omega$

AC WAVEFORMS

Figure 1.

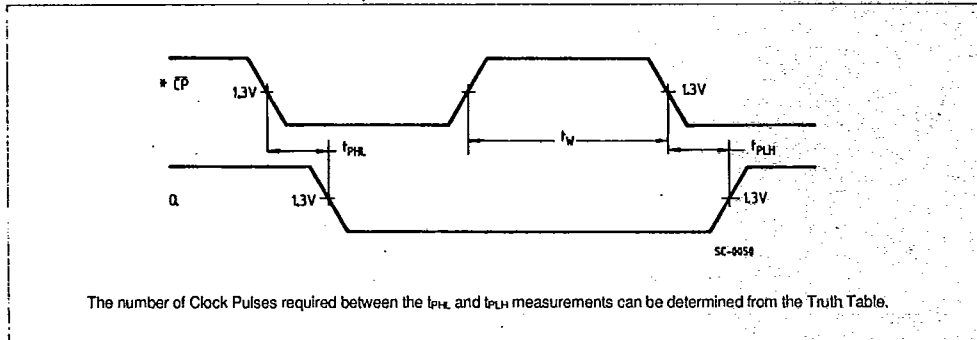
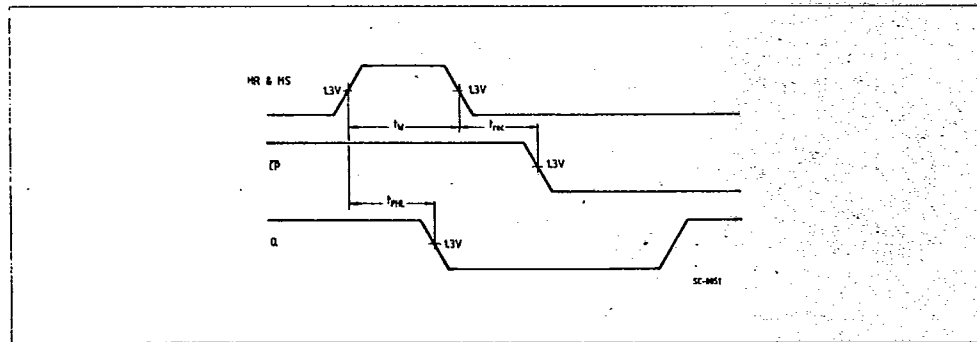


Figure 2.



42E D ■ 7929237 0033654 T ■ SGTH

Figure 3.

