

TRUTH TABLE

CLEAR	INPUTS					INTERNAL OUTPUTS		OUTPUT Q _H
	SHIFT/ LOAD	CLOCK INHIBIT	CLOCK	SERIAL	PARALLEL	Q _A	Q _B	
					A...H			
L	X	X	X	X	X	L	L	L
H	X	L	L	X	X	Q _{A0}	Q _{B0}	Q _{H0}
H	L	L	↑	X	a...h	a	b	h
H	H	L	↑	H	X	H	Q _{An}	Q _{Gn}
H	H	L	↑	L	X	L	Q _{An}	Q _{Gn}
H	X	H	↑	X	X	Q _{A0}	Q _{B0}	Q _{H0}

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 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 RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS166D2	4.5 V	5.0 V	5.5 V	-55°C to +125°C
T74LS166XX	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 Conditions (Note 1)	Units
			Min.	Typ.	Max.		
V _{IH}	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage for all Inputs	V
V _{IL}	Input LOW Voltage	54			0.7	Guaranteed input LOW Voltage for all Inputs	V
		74			0.8		
V _{CD}	Input Clamp Diode Voltage			- 0.65	- 1.5	V _{CC} = MIN, I _{IN} = - 18mA	V
V _{OH}	Output HIGH Voltage	54	2.5	3.4		V _{CC} = MIN, I _{OH} = - 400μA, V _{IN} = V _{IH} or V _{IL} per Truth Table	V
		74	2.7	3.4			
V _{OL}	Output LOW Voltage	54,74		0.25	0.4	V _{CC} = MIN, V _{IN} = V _{IH} or V _{IL} per Truth Table	V
		74		0.35	0.5		
I _{IH}	Input HIGH Current				20 0.1	V _{CC} = MAX, V _{IN} = 2.7V V _{CC} = MAX, V _{IN} = 7.0V	μA mA
I _{IL}	Input LOW Current				- 0.4	V _{CC} = MAX, V _{IN} = 0.4V	mA
I _{OS}	Output Short Circuit Current (Note 2)		- 20		- 100	V _{CC} = MAX	mA
I _{CC}	Power Supply Current				38	V _{CC} = MAX	mA

AC CHARACTERISTICS: T_A = 25°C

Symbol	Parameter		Limits			Test Conditions	Units
			Min.	Typ.	Max.		
f _{MAX}	Maximum Clock Frequency		25	35		V _{CC} = 5.0V C _L = 15pF	MHz
t _{PHL}	Clear to Output			19	30		ns
t _{PLH}	Clock to Output			23	35		ns
t _{PHL}				24	35		

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.
- 3) Typical values are at V_{CC} = 5.0V, T_A = 25°C



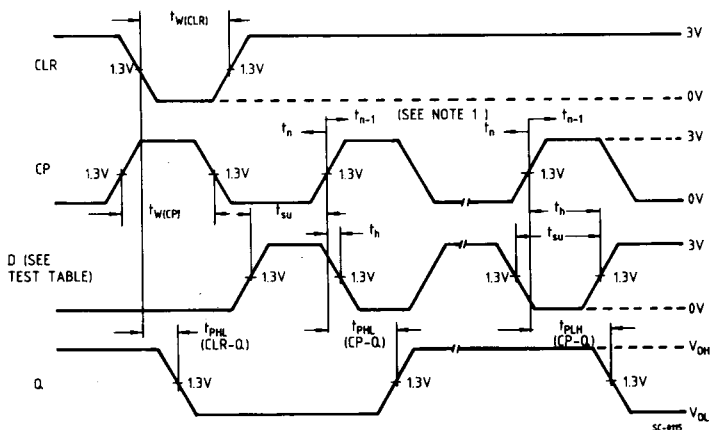
AC SET-UP REQUIREMENTS: $T_A = 25^\circ\text{C}$

Symbol	Parameter	Limits			Test Conditions	Units
		Min.	Typ.	Max.		
$t_{w\text{CLR}}$	Clock Clear Pulse Width	30			$V_{CC} = 5.0\text{V}$	ns
$t_{s\text{M}}$	Mode Control Set-up Time	30				ns
$t_{s\text{D}}$	Data Set-up Time	20				ns
t_{h}	Hold Time, Any Input	15				ns

AC WAVEFORMS

TEST TABLE FOR SYNCHRONOUS INPUT

DATA INPUT FOR TEST	SHIFT/LOAD	OUTPUT TESTED
H	0V	O_H at t_{n+1}
Serial Input	4.5V	O_H at t_{n+8}



Note: t_n = bit time before clocking transition
 t_{n+1} = bit time after one clocking transition
 t_{n+8} = bit time after eight clocking transitions