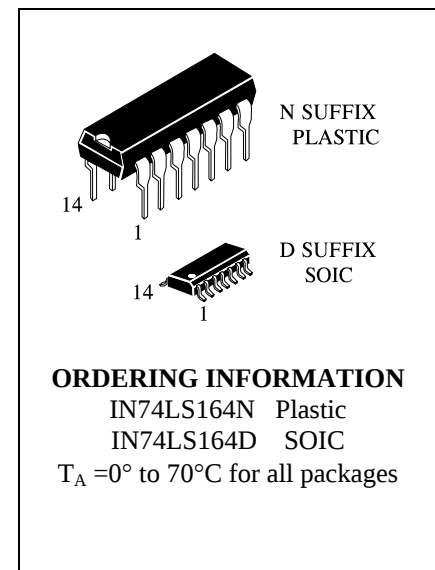


IN74LS164

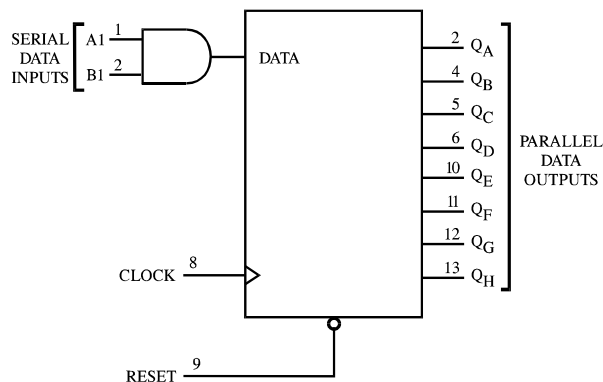
8-Bit Serial-Input/Parallel-Output Shift Register

This 8-bit shift register features gated serial inputs and an asynchronous reset. The gated serial inputs (A and B) permit complete control over incoming data as a low at either (or both) input(s) inhibits entry of the new data and resets the first flip flop to the low level at the next clock pulse. A high level input enables the other input which will then determine the state of the first flip-flop. Data at the serial inputs may be changed while the clock is high or low, but only information meeting the setup requirements will be entered clocking occurs or the low-to-high level transition of the clock input. All inputs are diode-clamped to minimize transmission-line effects.

- Gated (Enable/Disable) Serial Inputs
- Fully Buffered Clock and Serial Inputs
- Asynchronous Clear



LOGIC DIAGRAM



PIN 14 = V_{CC}
 PIN 7 = GND

PIN ASSIGNMENT

A1	1	14	V_{CC}
A2	2	13	Q_H
Q_A	3	12	Q_G
Q_B	4	11	Q_F
Q_C	5	10	Q_E
Q_D	6	9	RESET
GND	7	8	CLOCK

FUNCTION TABLE

Inputs				Outputs			
Reset	Clock	A1	A2	Q_A	Q_B	...	Q_H
L	X	X	X	L	L	...	L
H		X	X	no change			
H		H	D	D	Q_{An}	...	Q_{Gn}
H		D	H	D	Q_{An}	...	Q_{Gn}
H		L	L	L	Q_{An}	...	Q_{Gn}

D = data input

X = don't care

Q_{An} - Q_{Gn} = data shifted from the previous stage on a rising edge at the clock input.

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	7.0	V
V_{IN}	Input Voltage	7.0	V
V_{OUT}	Output Voltage	5.5	V
Tstg	Storage Temperature Range	-65 to +150	°C

*Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	4.75	5.25	V
V_{IH}	High Level Input Voltage	2.0		V
V_{IL}	Low Level Input Voltage		0.8	V
I_{OH}	High Level Output Current		-0.4	mA
I_{OL}	Low Level Output Current		8.0	mA
T_A	Ambient Temperature Range	0	+70	°C
f_{clock}	Clock Frequency	0	25	MHz
t_{su}	Setup Time, A1 or A2 to Clock	15		ns
t_h	Hold Time, Clock to A1 or A2	5		ns
t_w	Pulse Width, Clock	20		ns
t_w	Pulse Width, Reset	20		ns
t_{rec}	Recovery Time	5		ns

DC ELECTRICAL CHARACTERISTICS over full operating conditions

Symbol	Parameter	Test Conditions	Guaranteed Limit		Unit
			Min	Max	
V_{IK}	Input Clamp Voltage	$V_{CC} = \min, I_{IN} = -18 \text{ mA}$		-1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = \min, I_{OH} = -0.4 \text{ mA}$	2.7		V
V_{OL}	Low Level Output Voltage	$V_{CC} = \min, I_{OL} = 4 \text{ mA}$		0.4	V
		$V_{CC} = \min, I_{OL} = 8 \text{ mA}$		0.5	
I_{IH}	High Level Input Current	$V_{CC} = \max, V_{IN} = 2.7 \text{ V}$		20	mA
		$V_{CC} = \max, V_{IN} = 7.0 \text{ V}$		0.1	
I_{IL}	Low Level Input Current	$V_{CC} = \max, V_{IN} = 0.4 \text{ V}$		-0.4	mA
I_O	Output Short Circuit Current	$V_{CC} = \max, V_O = 0 \text{ V}$ (Noote 1)	-20	-100	mA
I_{CC}	Supply Current	$V_{CC} = \max$ (Note 2)		27	mA

Note 1: Not more than one output should be shorted at a time, and duration should not exceed one second.

Note 2: I_{CC} is measured with outputs open, serial inputs grounded, the clock input at 2.4 V, and a momentary ground, then 4.5 V applied.

--	--	--	--	--	--

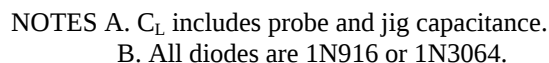
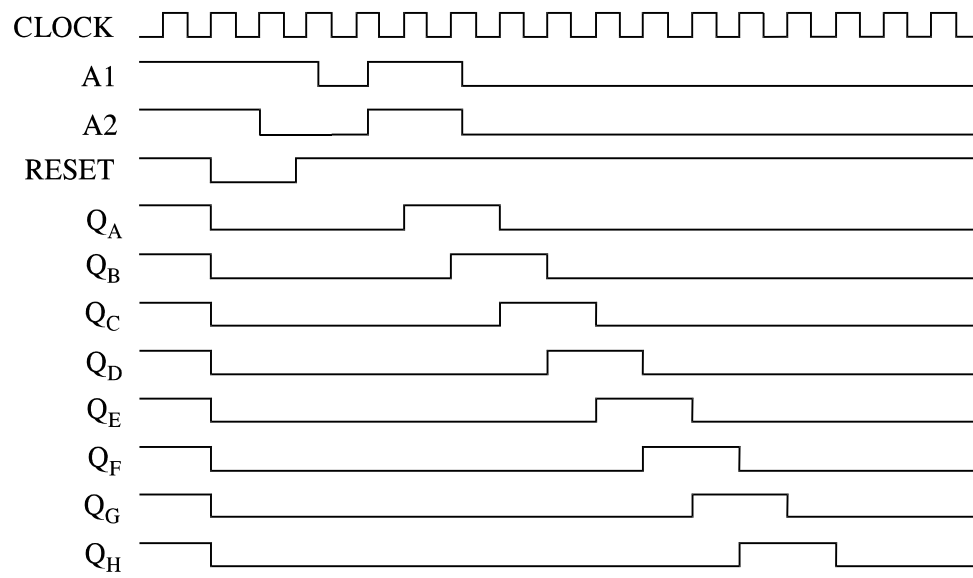
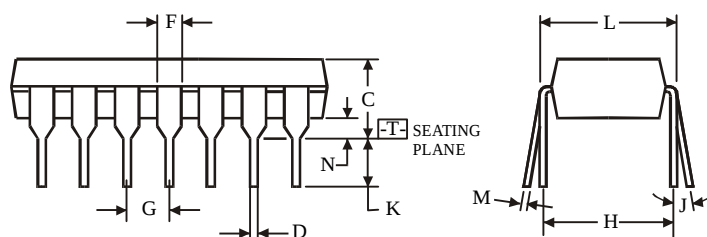
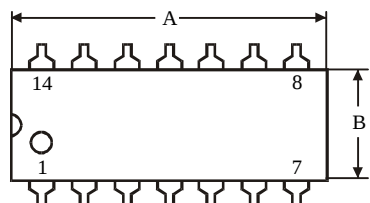
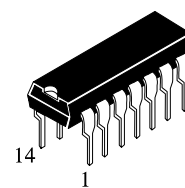


Figure 4. Test Circuit

TIMING DIAGRAM



N SUFFIX PLASTIC DIP
(MS - 001AA)



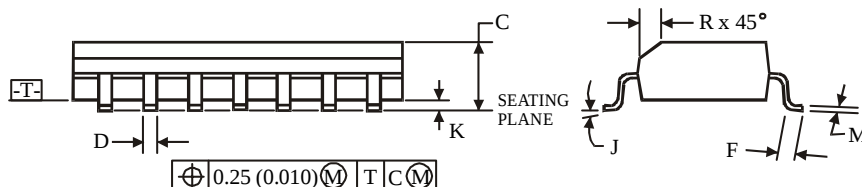
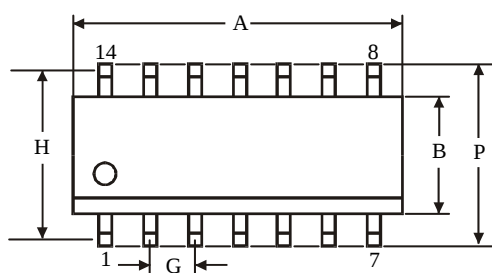
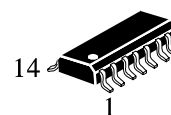
$$\oplus 0.25 (0.010) \text{ (M) } T$$

NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

Dimension, mm		
Symbol	MIN	MAX
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

D SUFFIX SOIC
(MS - 012AB)



$$\oplus 0.25 (0.010) \text{ (M) } T \text{ C (M)}$$

NOTES:

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side
for A; for B - 0.25 mm (0.010) per side.

Dimension, mm		
Symbol	MIN	MAX
A	8.55	8.75
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.27	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5