

1. DESCRIPTION

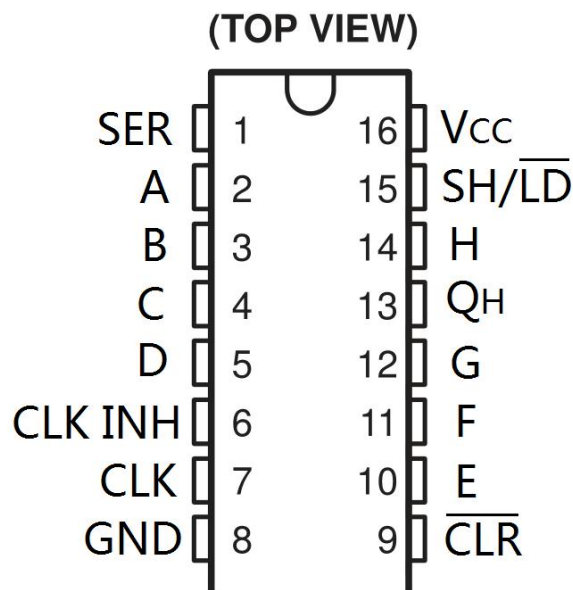
The 74LS166 8-bit shift register is compatible with most other TTL logic families. All 74LS166 inputs are buffered to lower the drive requirements to one Series 74LS standard load, respectively. Input clamping diodes minimize switching transients and simplify system design.

These parallel-in serial-in, serial-out shift registers have a complexity of 77 equivalent gates on a monolithic chip. They feature gates clock inputs and an overriding clear input. The parallel-in or serial-in modes are established by the shift/load input. When high, this input enables the serial data input and couples the eight flip-flops for serial shifting with each clock pulse. When low, the parallel (broadside) data inputs are enabled and synchronous loading occurs on the next clock pulse. During parallel loading, serial data flow is inhibited. Clocking is accomplished on the low-to-high-level edge of the clock pulse through a two-input positive NOR gate permitting one input to be used as a clock-enable or clock-inhibit function. Holding either of the clock inputs high inhibits clocking; holding either low enables the other clock input. This, of course, allows the system clock to be free-running and the register can be stopped on command with the other clock input. The clock inhibit input should be changed to the high level only while the clock input is high. A buffered, direct clear input overrides all other inputs, including the clock, and sets all flip-flops to zero.

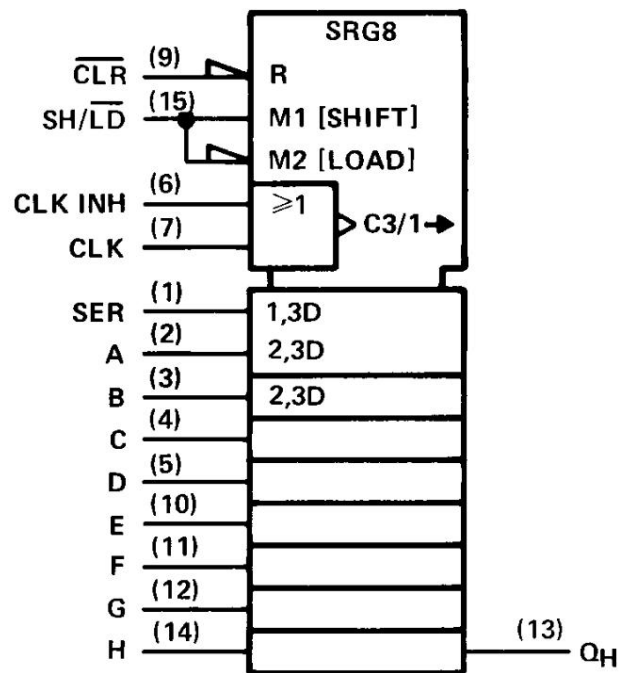
2. FEATURES

- Synchronous Load
- Direct Overriding Clear
- Parallel to Serial Conversion

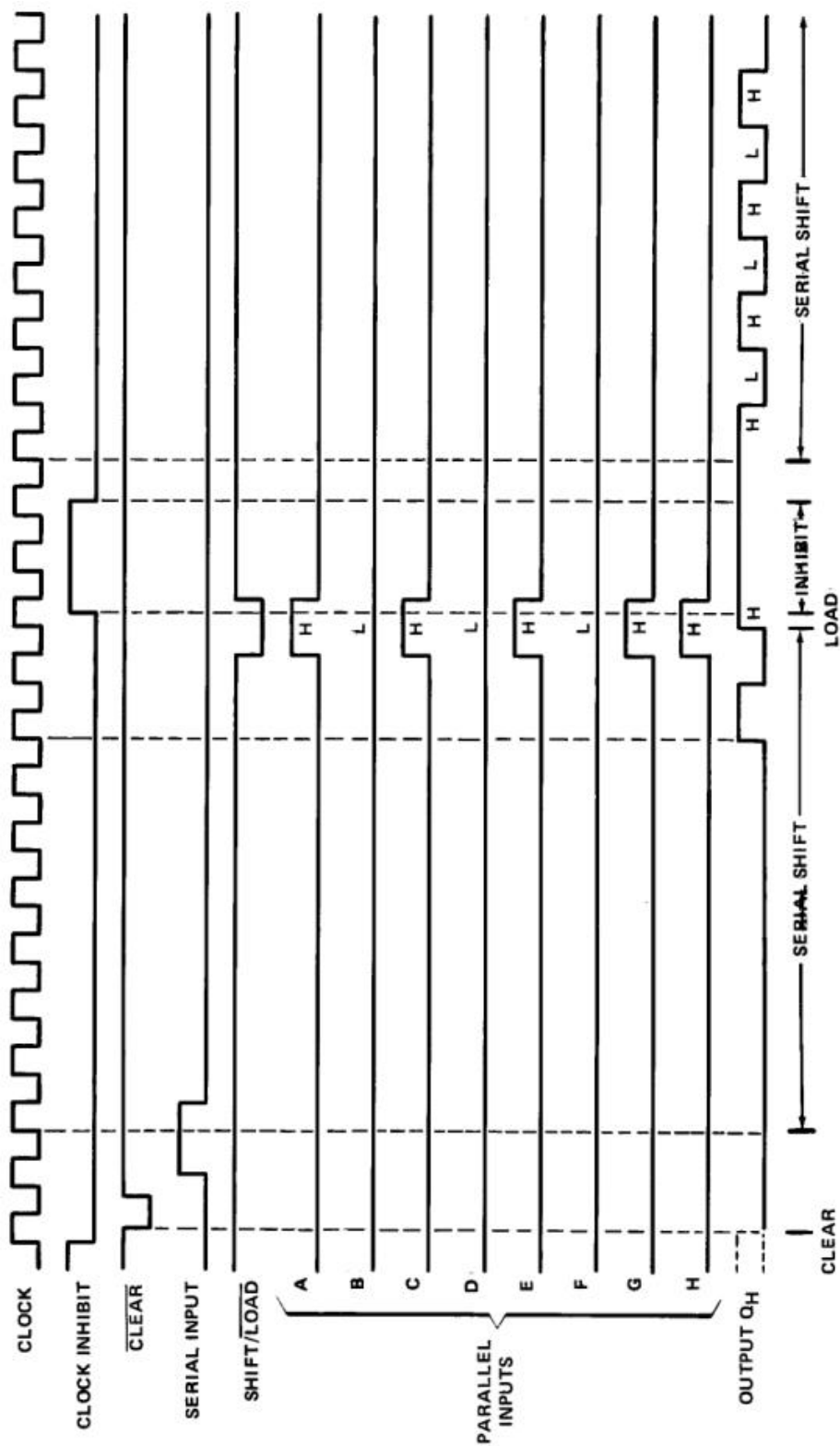
3. PIN CONFIGURATIONS



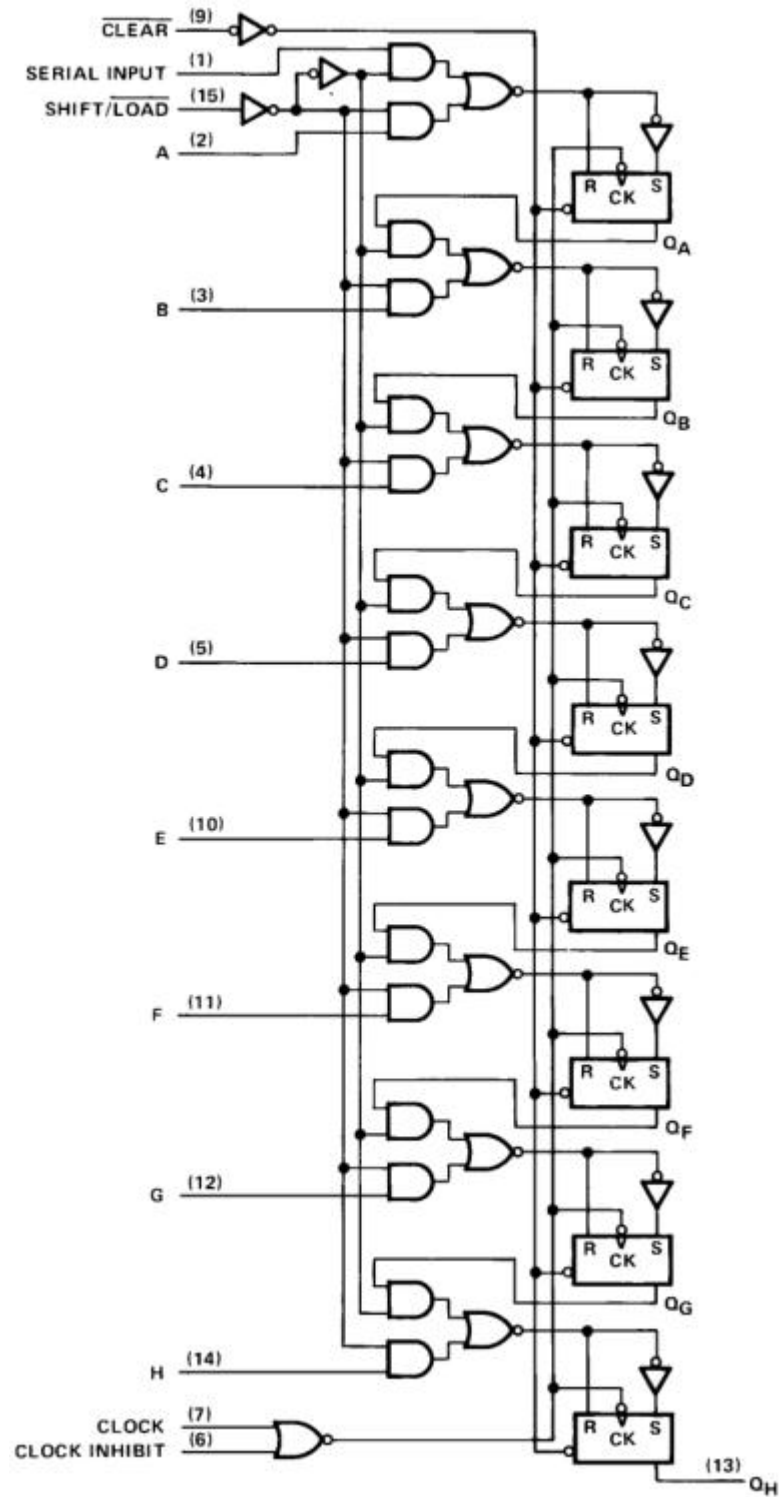
4. LOGIC SYMBOL



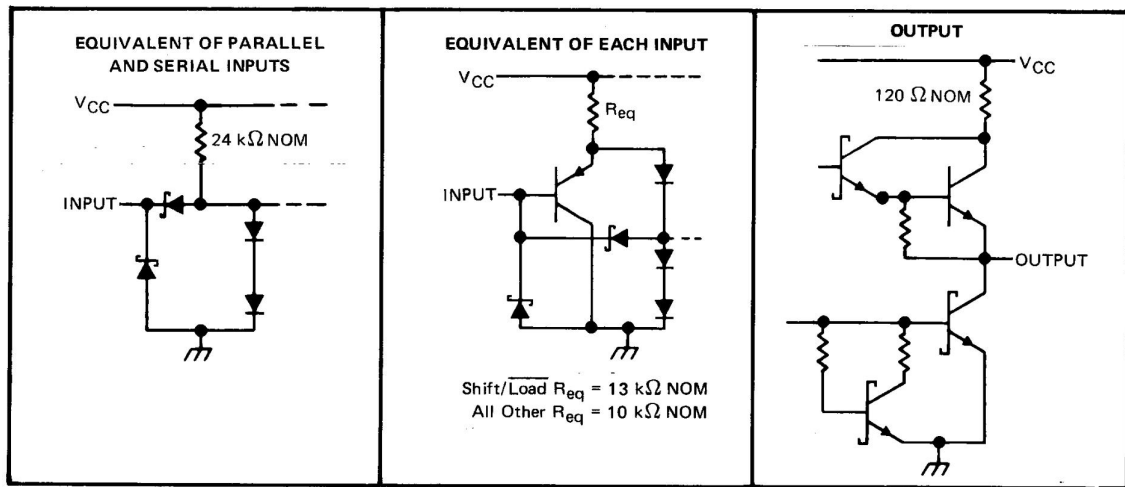
5. TYPICAL CLEAR,SHIFT,LOAD,INHABIT,AND SHIFT SEQUENCES



6. LOGIC DIAGRAMS



7. SCHEMATICS OF INPUTS AND OUTPUTS



8. ABSOLUTE MAXIMUM RATINGS OVER OPERATING FREE-AIR TEMPERATURE RANGE (UNLESS OTHERWISE NOTES)

Supply voltage, V_{CC} 7V

Input voltage, V_I : 74LS166..... 7V

Operating free-air temperature range: DIP package..... 0°C to 70°C

Storage temperature range, T_{stg} -65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

9. RECOMMENDED OPERATING CONDITIONS

		74LS166			UNIT
		MIN	NOM	MAX	
V _{CC}	Supply voltage	4.75	5	5.25	V
V _{IH}	High-level input voltage	2			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	mA
f _{clock}	Clock frequency	0		25	MHz
t _w	Width of clear pulse	20			ns
t _w	Width of cl pulse	25			ns
t _{su}	Mode-control setup time	30			ns
t _{su}	Data setup time	20			ns
t _h	Hold time at any input	0			ns
T _A	Operating free-air temperature	0		70	°C

10. ELECTRICAL CHARACTERISTICS OVER RECOMMENDED OPERATING FREE-AIR RANGE (UNLESS OTHERWISE NOTED)

PARAMETER		TEST CONDITIONS [†]	74LS166			UNIT
			MIN	TYP [‡]	MAX	
V _{IK}	Input clamp voltage	V _{CC} = MIN, I _I = -18 mA			-1.5	V
V _{OH}	High-level output voltage	V _{CC} = MIN, V _{IL} = 0.8 V, V _{IH} = 2 V, I _{OH} = -0.4 mA	2.7	3.4		V
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL} MAX		0.25	0.4	V
				0.35	0.5	
I _I	Input current at maximum input voltage	V _{CC} = MAX, V _I = 7 V			0.1	mA
I _{IH}	High-level input current	V _{CC} = MAX, V _I = 2.7 V			20	μA
I _{IL}	Low-level input current	V _{CC} = MAX, V _I = 0.4 V			-0.4	mA
I _{OS}	Short-circuit output current [§]	V _{CC} = MAX	-20		-100	mA
I _{CC}	Supply current	V _{CC} = MAX		20	32	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at V_{CC} = 5 V, T_A = 25°C.

[§] Not more than one output should be shorted at a time.

11. SWITCHING CHARACTERISTICS, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

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PARAMETER†	TEST CONDITIONS	MIN	TYP	MAX	UNIT
f_{MAX}	$C_L = 15\text{ pF}, R_L = 2\text{ k}\Omega$	25	35		MHz
t_{PLH}			19	30	ns
t_{PHL}		7	14	25	ns
t_{PLH}		5	11	20	ns

† t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

12. ORDERING INFORMATION

Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XD74LS166	XD74LS166	DIP16	19.05 * 6.35	-0 to 70	MSL3	Tube 25	1000

13. DIMENSIONAL DRAWINGS

