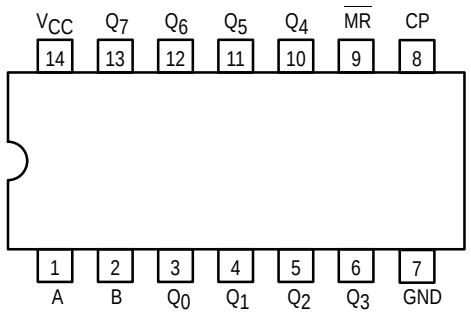
DESCRIPTION

The SN74LS164 is a high speed 8-Bit Serial-In Parallel-Out Shift Register. Serial data is entered through a 2-Input AND gate synchronous with the LOW to HIGH transition of the clock. The device features an asynchronous Master Reset which clears the register setting all outputs LOW independent of the clock.
It utilizes the Schottky diode clamped process to achieve high speeds and is fully compatible with all Motorola TTL products.

FEATURES

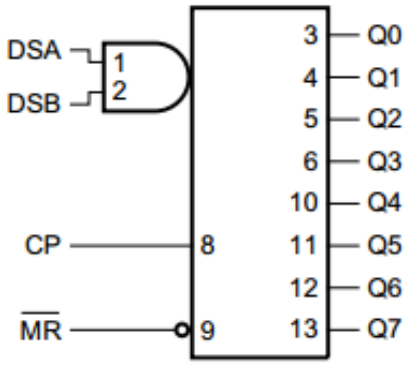
- Typical Shift Frequency of 35 MHz
- Asynchronous Master Reset
- Fully Synchronous Data Transfers
- Gated Serial Data Input
- Input Clamp Diodes Limit High Speed Termination Effects
- ESD > 3500 Volts

PIN ASSIGNMENT

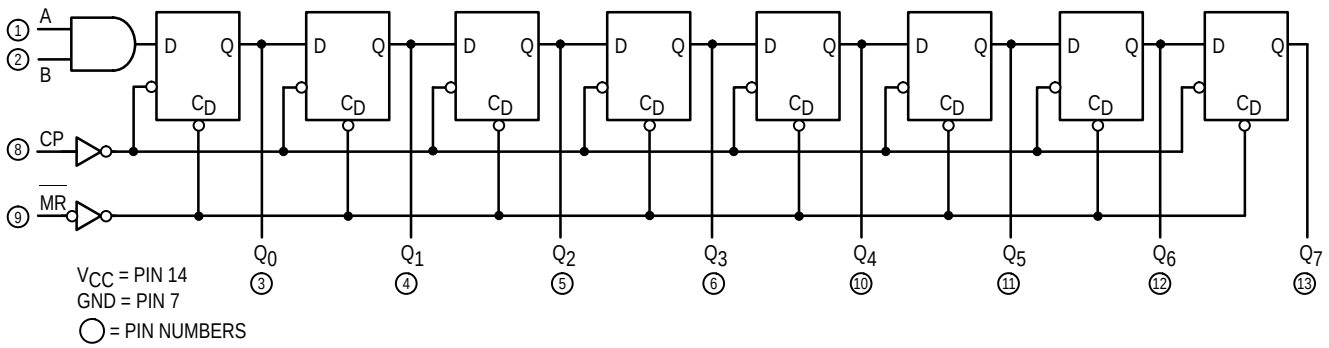


SOP/DIP-14

LOGIC SYMBOL



LOGIC DIAGRAM



FUNCTIONAL DESCRIPTION

OPERATING MODE	INPUTS			OUTPUTS	
	$\overline{MR}$	DSA	DSB	Q0	Q1～Q7
Reset (Clear)	L	X	X	L	L～L
Shift	H	l	l	L	q0～q6
	H	l	h	L	q0～q6
	H	h	l	L	q0～q6
	H	h	h	H	q0～q6

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

GUARANTEED OPERATING RANGES

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.75	5.0	5.75	V
Input Voltage	I_{OH}			-0.4	mA
Storage Temperature	I_{OL}			8	mA
Operating Ambient Temperature Range	T_A	0		70	℃

DC CHARACTERISTICS (T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IH}	Input HIGH Voltage	Guaranteed Input HIGH Voltage for All Inputs	2.0			V
V_{IL}	Input LOW Voltage	Guaranteed Input LOW Voltage for All Inputs			0.8	V
V_{IK}	Input Clamp Diode Voltage	VCC = MIN, IIN = −18 mA		-0.65	-1.5	V
V_{OH}	Output HIGH Voltage	VCC = MIN, IOH = MAX, VIN = VIH or VIL per Truth Table	2.7		3.5	V
V_{OL}	Output LOW Voltage	VCC = VCC MIN, VIN = VIH or VIL per Truth Table		0.35	0.5	V
I_{IH}	Input HIGH Current	VCC = MAX, VIN = 2.7 V			20	uA
		VCC = MAX, VIN = 7.0 V			100	uA
I_{IL}	Input LOW Current	VCC = MAX, VIN = 0.4 V			-400	uA
I_{OS}	Short Circuit Current	VCC = MAX	-20		-100	mA
I_{CC}	Power Supply Current	VCC = MAX			27	mA

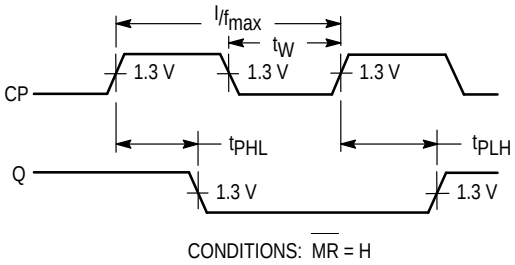
AC CHARACTERISTICS (T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
f_{MAX}	Maximum Clock Frequency	VCC = 5.0 V CL = 15 pF	25	36		MHz
t_{PHL}	Propagation Delay MR to Output Q			24	36	ns
t_{IK}	Propagation Delay Clock to Output Q			17	27	ns
t_{PHL}				21	32	ns

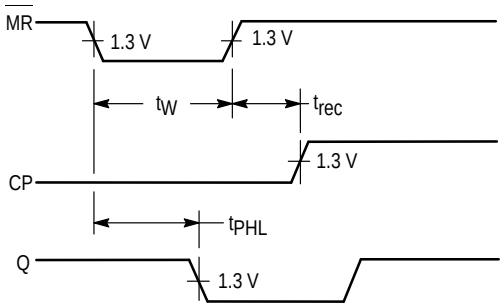
AC SETUP REQUIREMENTS (T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_W	CP, MR Pulse Width	VCC = 5.0 V	25	36		ns
t_S	Data Setup Time			24	36	ns
t_h	Data Hold Time			17	27	ns
t_{rec}	MR to Clock Recovery Time			21	32	ns

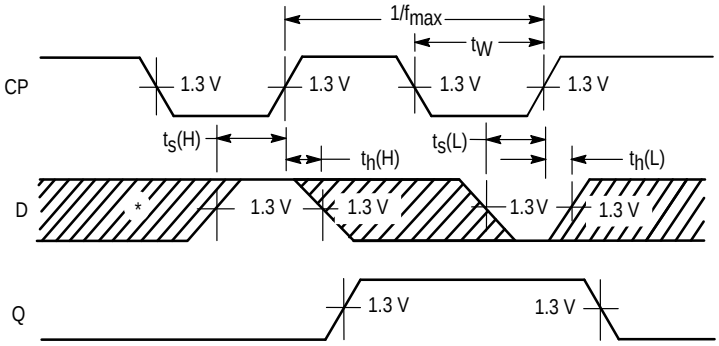
AC WAVEFORMS



Clock to Output Delays and Clock Pulse Width



Master Reset Pulse Width, Master Reset to Output Delay and Master Reset to Clock Recovery Time

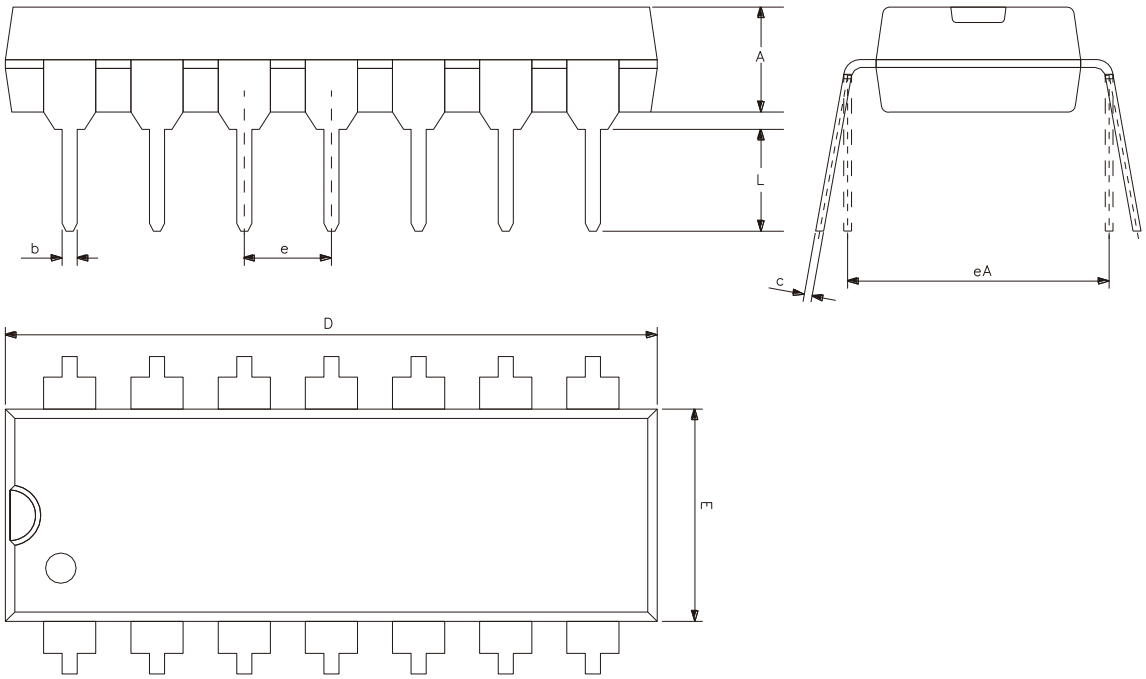


Data Setup and Hold Times

ORDERING GUIDE

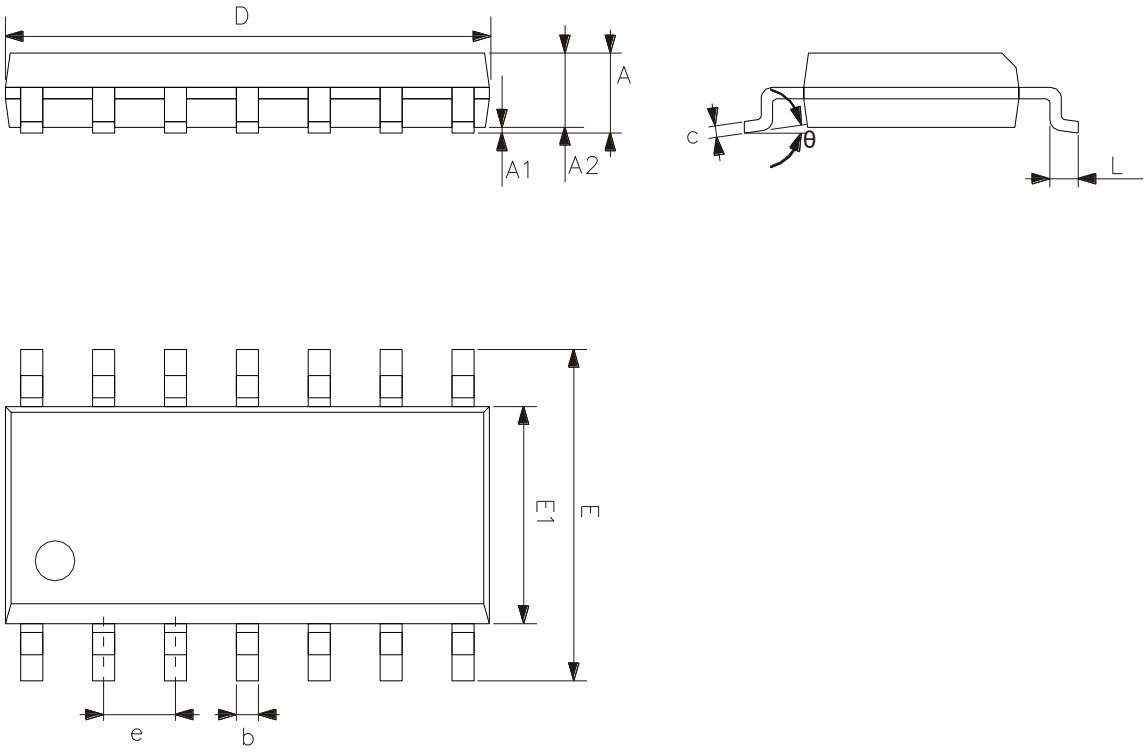
Model	Package Description	Qty(PCS)
SN74LS164DR	SOP-14	2500
SN74LS164N	DIP-14	25

PACKAGE OUTLINE DIMENSIONS
DIP-14



SYMBOY	COMMON DIMENSIONS (mm)	
	MIN	MAX
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	—

PACKAGE OUTLINE DIMENSIONS
SOP-14



SYMBOY	COMMON DIMENSIONS (mm)	
	MIN	MAX
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°

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