



DESCRIPTION

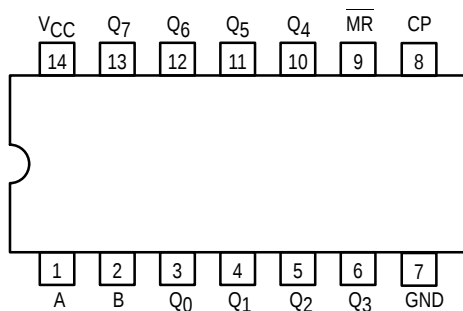
The SN74LS164 is a high speed 8-Bit Serial-In Parallel-Out Shift Register. Serial data is entered through a 2-Input AND gate synchronous with the LOW to HIGH transition of the clock. The device features an asynchronous Master Reset which clears the register setting all outputs LOW independent of the clock.

It utilizes the Schottky diode clamped process to achieve high speeds and is fully compatible with all Motorola TTL products.

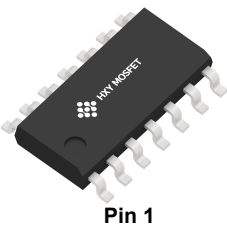
FEATURES

- 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



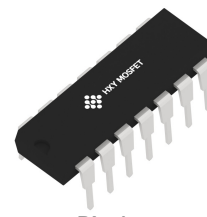
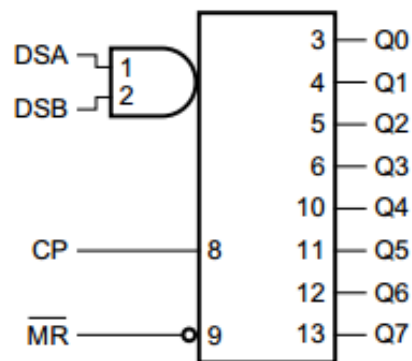
SOP-14(SOIC-14)/DIP-14



Pin 1

SOP-14(SOIC-14)

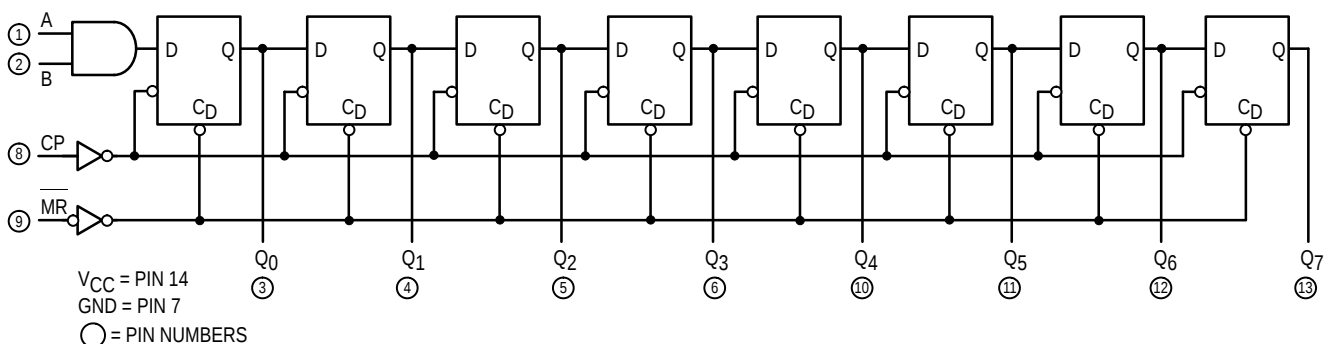
LOGIC SYMBOL



Pin 1

DIP-14

LOGIC DIAGRAM





FUNCTIONAL DESCRIPTION

OPERATING MODE	INPUTS			OUTPUTS	
	$\overline{\text{MR}}$	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	°C



DC CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

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	$V_{CC} = \text{MIN}, I_{IN} = -18 \text{ mA}$		-0.65	-1.5	V
V_{OH}	Output HIGH Voltage	$V_{CC} = \text{MIN}, I_{OH} = \text{MAX}, V_{IN} = V_{IH}$ or V_{IL} per Truth Table	2.7		3.5	V
V_{OL}	Output LOW Voltage	$V_{CC} = V_{CC} \text{ MIN},$ $V_{IN} = V_{IH}$ or V_{IL} per Truth Table		0.35	0.5	V
I_{IH}	Input HIGH Current	$V_{CC} = \text{MAX}, V_{IN} = 2.7 \text{ V}$			20	μA
		$V_{CC} = \text{MAX}, V_{IN} = 7.0 \text{ V}$			100	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{MAX}, V_{IN} = 0.4 \text{ V}$			-400	μA
I_{OS}	Short Circuit Current	$V_{CC} = \text{MAX}$	-20		-100	mA
I_{CC}	Power Supply Current	$V_{CC} = \text{MAX}$			27	mA

AC CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

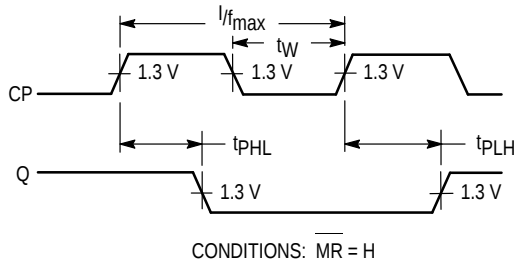
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
f _{MAX}	Maximum Clock Frequency	VCC = 5.0 V CL = 15 pF	25	36		MHz
t _{PHL}	Propagation Delay MR to Output Q			24	36	ns
t _{IK}	Propagation Delay Clock to Output Q			17	27	ns
t _{PHL}				21	32	ns

AC SETUP REQUIREMENTS ($T_A = 25^\circ\text{C}$)

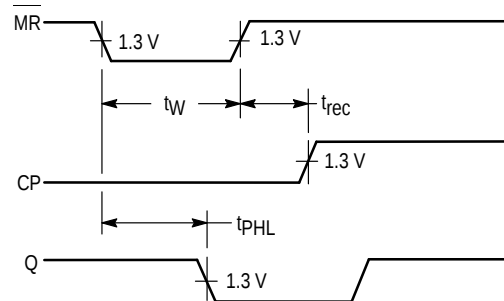
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_w	CP, MR Pulse Width	$V_{CC} = 5.0 \text{ V}$	25	36		ns
t_s	Data Setup Time			24	36	ns
t_h	Data Hold Time			17	27	ns
t_{rec}	MR to Clock Recovery Time			21	32	ns



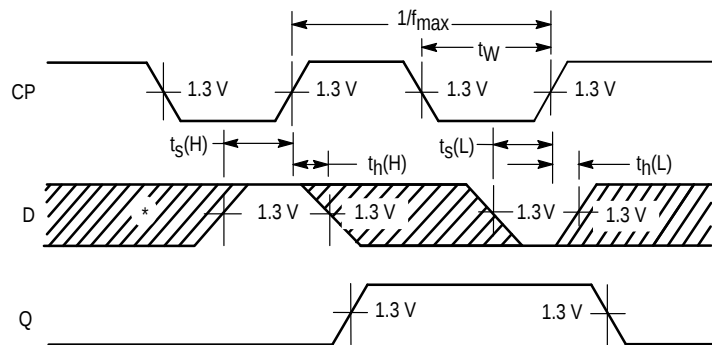
AC WAVEFORMS



**Clock to Output Delays
and Clock Pulse Width**



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



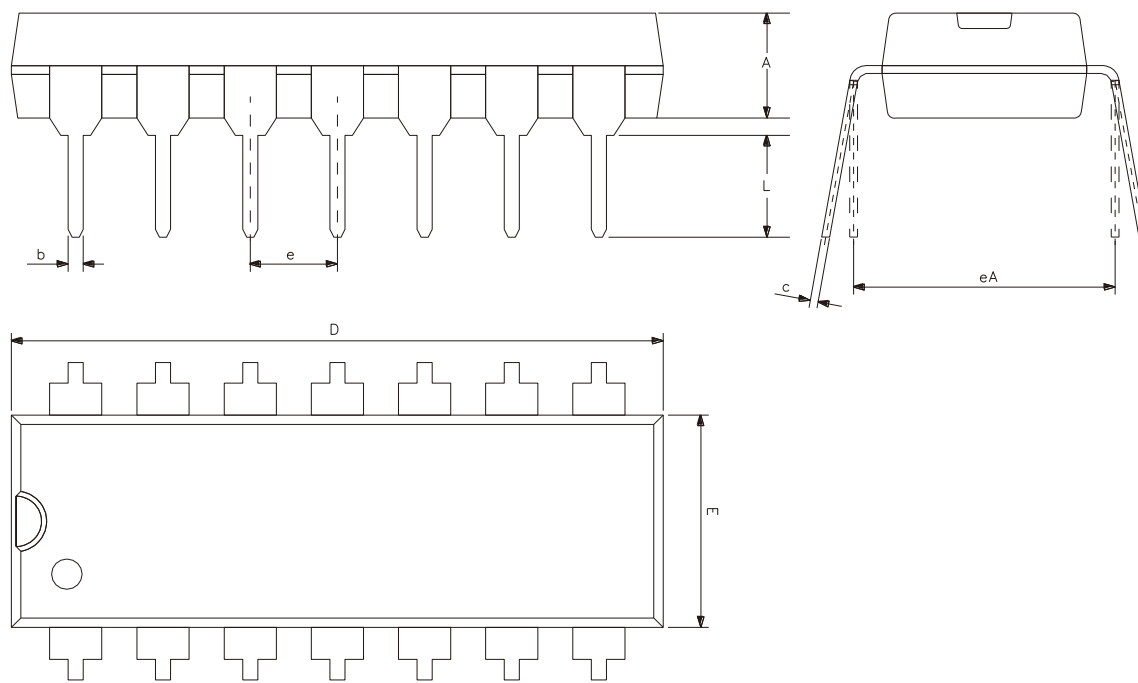
Data Setup and Hold Times

ORDERING GUIDE

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



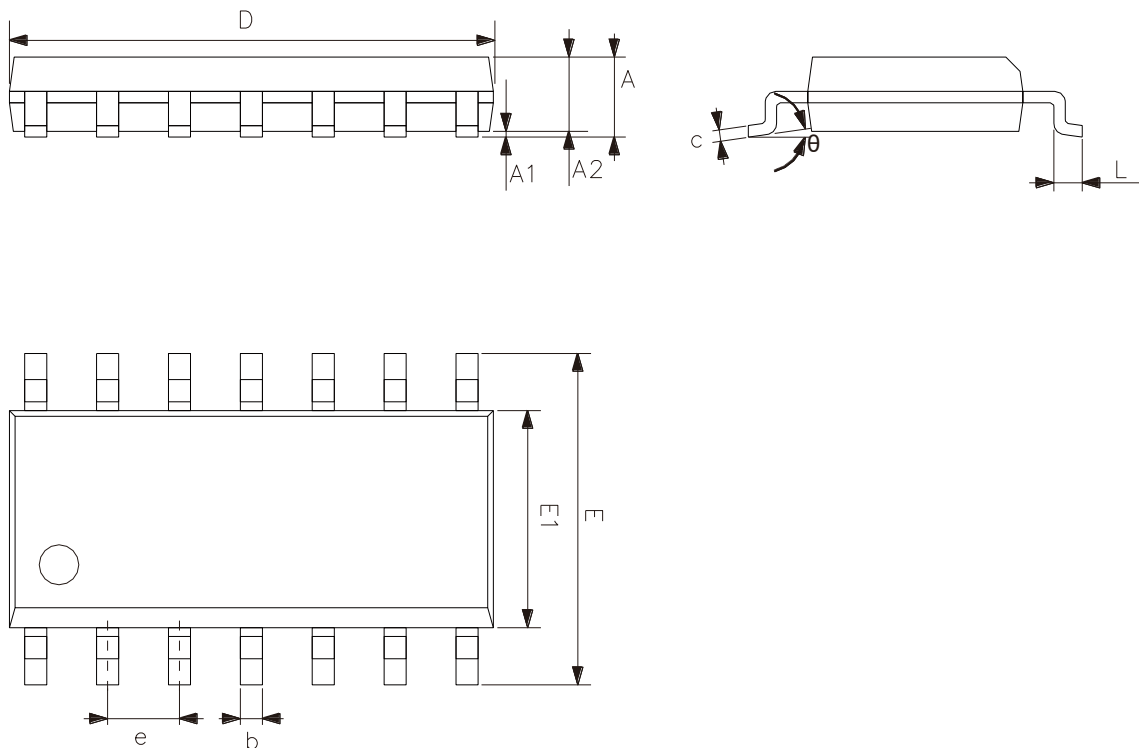
PACKAGE OUTLINE DIMENSIONS
DIP-14



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(SOIC-14)



SYMBOL	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°



Attention

- Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.
- HUA XUAN YANG ELECTRONICS assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein.
- Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of HUA XUAN YANG ELECTRONICS CO.,LTD.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.