



## U74AHC164

CMOS IC

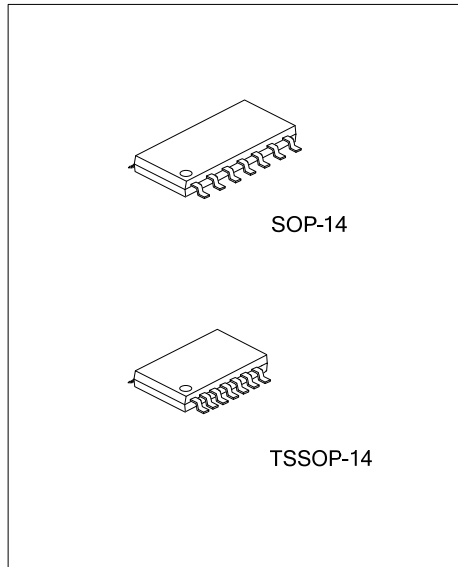
### 8-BIT SERIAL-PARALLEL-OUT SHIFT REGISTER

#### DESCRIPTION

The **U74AHC164** is an 8-bit serial-in/parallel-out shift register. The logical AND of the Dsa and Dsb enters into Q0 and shifts one place to right on each LOW-to-HIGH transition of the clock (CP). A low level on the master reser ( $\overline{MR}$ )input clears all the register asynchronously and force all output LOW.

#### FEATURES

- \* Operate From 2V to 5.5V
- \* Schmitt on all inputs
- \* Balanced propagation delays

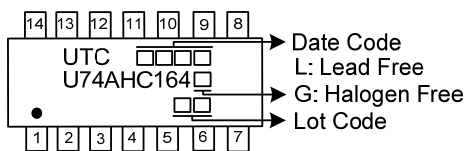


#### ORDERING INFORMATION

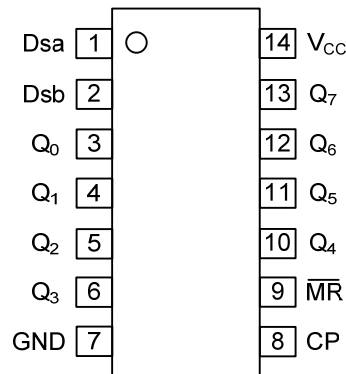
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC164G-S14-R	U74AHC164G-S14-R	SOP-14	Tape Reel
U74AHC164G-P14-R	U74AHC164G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC164G-S14-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S14: SOP-14, P14: TSSOP-14</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
---	---

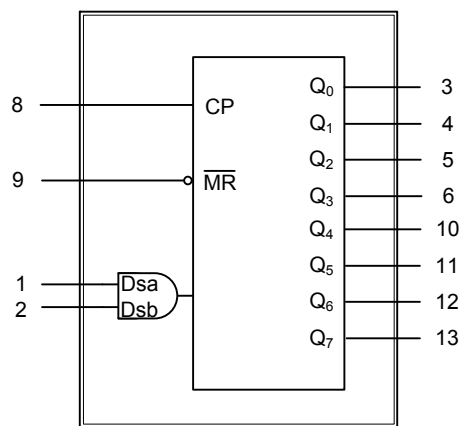
#### MARKING



■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

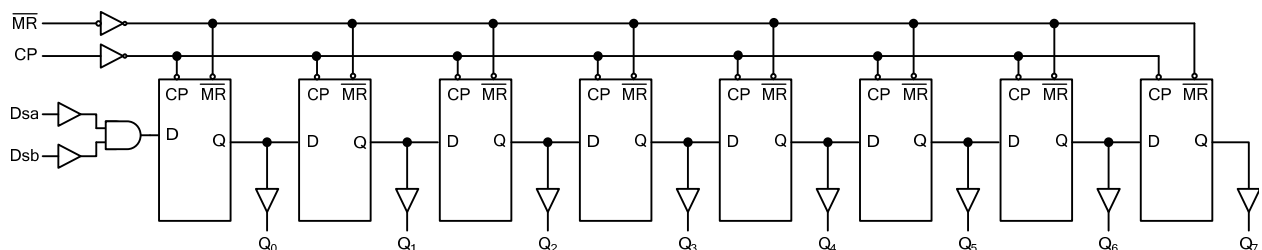


■ FUNCTION TABLE

INPUT				OUTPUT	
$\overline{\text{MR}}$	CP	DSA	DSB	Q0	Q1 to Q7
L	X	X	X	L	L to L
H	L	X	X	Q0	Q1 to Q7
H	↑	L	L	L	Q0 to Q6
H	↑	L	H	L	Q0 to Q6
H	↑	H	L	L	Q0 to Q6
H	↑	H	H	H	Q0 to Q6

Note: H: HIGH voltage level; L: LOW voltage level; ↑: LOW-to-HIGH transition; x: don't care.

■ LOGIC DIAGRAM (POSITIVE LOGIC)



## ■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		$V_{CC}$	-0.5~7	V
Input Voltage		$V_{IN}$	-0.5~ 7	V
Input Clamp Current		$I_{IK}$	-20	mA
Output Clamp Current		$I_{OK}$	±20	mA
Output Current		$I_{OUT}$	±25	mA
Vcc or GND Current		$I_{CC}$	±75	mA
Power Dissipation	SOP-14	$P_D$	500	mW
	TSSOP-14		450	
Storage Temperature		$T_{STG}$	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2	5	5.5	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$t_R, t_F$	$V_{CC}=3.3\pm0.3V$			100	ns/V
		$V_{CC}=5.0\pm0.5V$			20	
Operating Temperature	$T_A$		-40		85	°C

## ■ STATIC CHARACTERISTICS ( $T_A=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=3.0V$	2.1			
		$V_{CC}=5.5V$	3.85			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2.0V$			0.5	V
		$V_{CC}=3.0V$			0.9	
		$V_{CC}=5.5V$			1.65	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2.0V, I_{OH}=-50\mu A$	1.9	2.0		V
		$V_{CC}=3.0V, I_{OH}=-50\mu A$	2.9	3.0		
		$V_{CC}=4.5V, I_{OH}=-50\mu A$	4.4	4.5		
		$V_{CC}=3.0V, I_{OH}=-4mA$	2.58			
		$V_{CC}=4.5V, I_{OH}=-8mA$	3.94			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2.0V, I_{OL}=50\mu A$		0	0.1	V
		$V_{CC}=3.0V, I_{OL}=50\mu A$		0	0.1	
		$V_{CC}=4.5V, I_{OL}=50\mu A$		0	0.1	
		$V_{CC}=3.0V, I_{OL}=4mA$			0.36	
		$V_{CC}=4.5V, I_{OL}=8mA$			0.36	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=5.5V, V_{IN}=5.5V$ or GND			0.1	μA
Output OFF-State Current	$I_{OZ}$	$V_{CC}=5.5V, V_{IN}=5.5V$ or GND			±0.25	uA
Quiescent Supply Current	$I_Q$	$V_{CC}=5.5V, V_{IN}=5.5V$ or GND, $I_{OUT}=0$			4	uA
Input Capacitance	$C_I$	$V_{IN}=V_{CC}$ or GND		3	10	pF

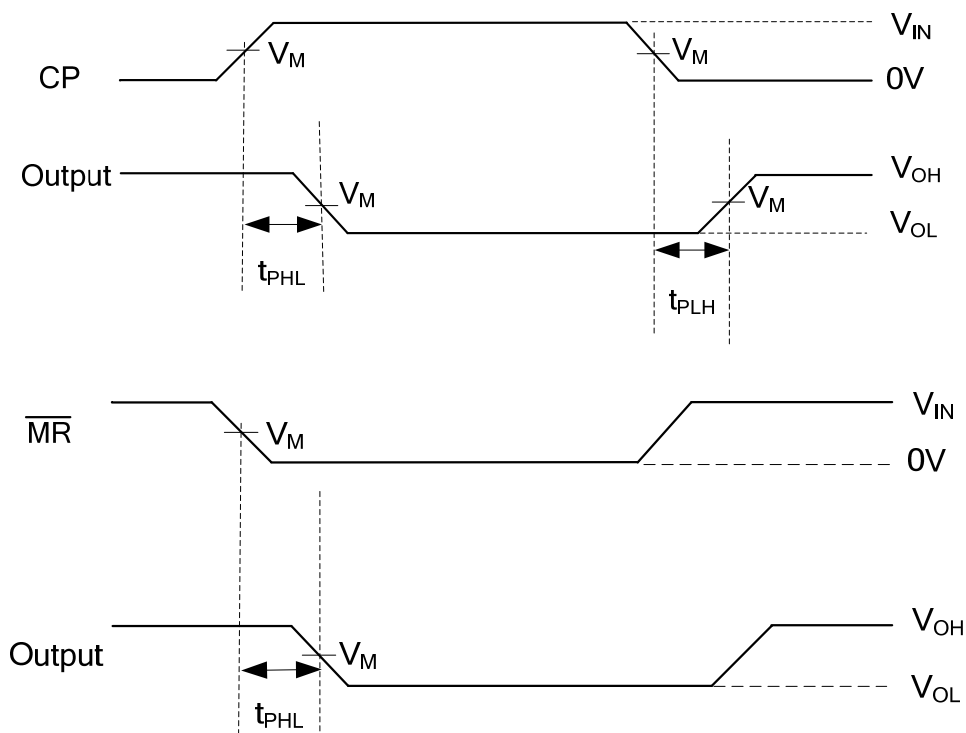
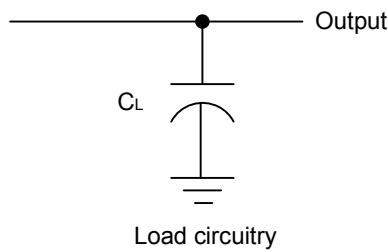
■ DYNAMIC CHARACTERISTICS (typical values at  $V_{CC}=3V$  or  $V_{CC}=5V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input (CP) to Output(Qn)	$t_{PHL}/t_{PLH}$	$V_{CC}=3.0V$ to $3.6V$ , $C_L=15pF$		6.5	12.8	ns
		$V_{CC}=3.0V$ to $3.6V$ , $C_L=50pF$		9.3	16.3	
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=15pF$		4.5	9	
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=50pF$		6.4	11	
Propagation Delay from Input ( $\overline{MR}$ ) to Output(Qn)	$t_{PHL}$	$V_{CC}=3.0V$ to $3.6V$ , $C_L=15pF$		5.3	12.8	ns
		$V_{CC}=3.0V$ to $3.6V$ , $C_L=50pF$		7.6	16.3	
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=15pF$		4	8.6	
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=50pF$		5.8	10.6	
Maximum CP frequency	$f_{MAX}$	$V_{CC}=3.0V$ to $3.6V$ , $C_L=15pF$	80	125		MHz
		$V_{CC}=3.0V$ to $3.6V$ , $C_L=50pF$	50	75		
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=15pF$	125	175		
		$V_{CC}=4.5V$ to $5.5V$ , $C_L=50pF$	85	115		

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	$f=1MHz$ , $C_L=50pF$		48		pF

■ TEST CIRCUIT AND WAVEFORMS



Note:  $V_{IN}=V_{CC}$ ,  $V_M=50\%V_{CC}$

Propagation delay waves

UTC 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 UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.